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# ERAWATCH Country Reports 2013: Bosnia and Herzegovina

Zoran Ergarac

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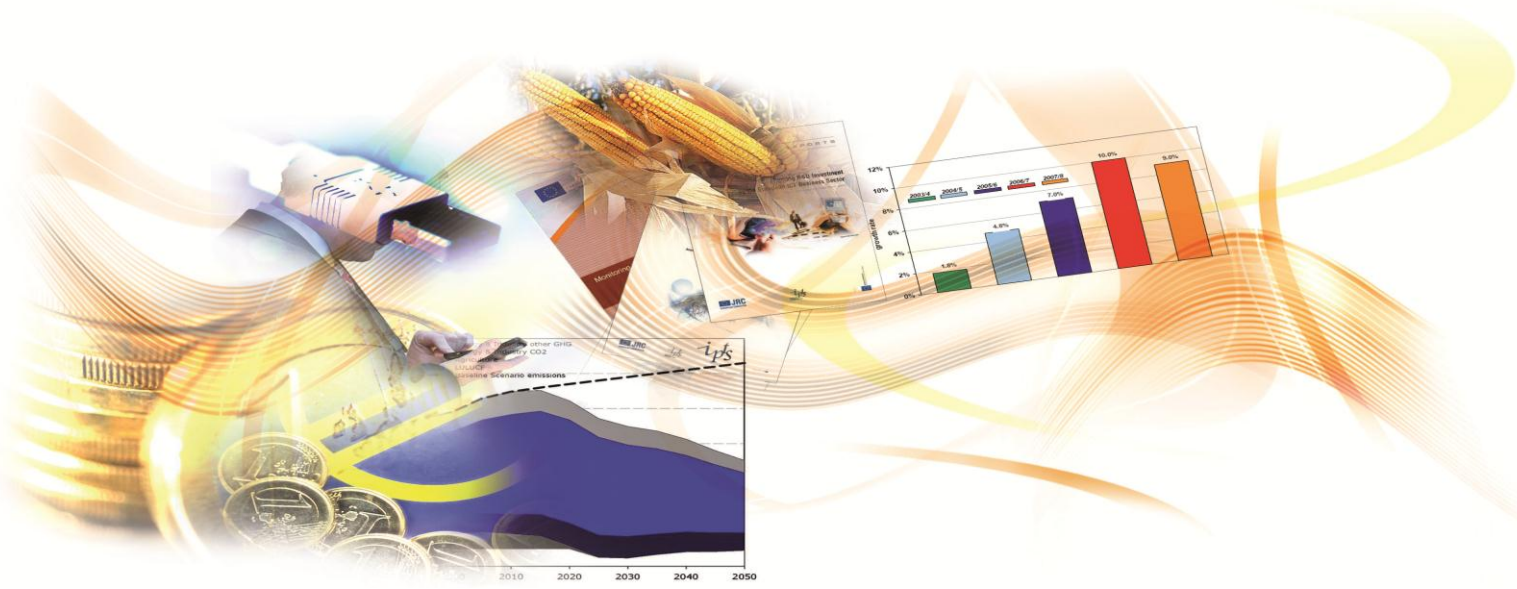

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**Abstract**

The Analytical Country Reports analyse and assess in a structured manner the evolution of the national policy research and innovation in the perspective of the wider EU strategy and goals, with a particular focus on the performance of the national research and innovation (R&I) system, their broader policy mix and governance. The 2013 edition of the Country Reports highlight national policy and system developments occurring since late 2012 and assess, through dedicated sections:

- national progress in addressing Research and Innovation system challenges;
- national progress in addressing the 5 ERA priorities;
- the progress at Member State level towards achieving the Innovation Union;
- the status and relevant features of Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3);
- as far relevant, country Specific Research and Innovation (R&I) Recommendations.

Detailed annexes in tabular form provide access to country information in a concise and synthetic manner.
The reports were originally produced in December 2013, focusing on policy developments occurring over the preceding twelve months.

# ACKNOWLEDGMENTS AND FURTHER INFORMATION

This analytical country report is one of a series of annual ERAWATCH reports produced for EU Member States and Countries Associated to the Seventh Framework Programme for Research of the European Union (FP7). ERAWATCH is a joint initiative of the European Commission's Directorate General for Research and Innovation and Joint Research Centre.

The Country Report 2013 builds on and updates the 2012 edition. The report identifies the structural challenges of the national research and innovation system and assesses the match between the national priorities and the structural challenges, highlighting the latest developments, their dynamics and impact in the overall national context.

The first draft of this report was produced in December 2013 and was focused on developments taking place in the previous twelve months. In particular, it has benefitted from the comments and suggestions of Nida-Kamil OZBOLAT from JRC-IPTS.

The report is currently only published in electronic format and is available on the ERAWATCH website. Comments on this report are welcome and should be addressed to jrc-ipts-erawatch-helpdesk@ec.europa.eu.

# EXECUTIVE SUMMARY

The 2012 BiH GERD was €35.57m or 0.27% of country's GDP (BiH Agency of Statistics, 2014). This is the first official figure for BiH GERD, published at the end of January 2014, and it is far below the EU 28 average of 2.06% in 2012. There are 781,4 researchers per million populations in BiH (Doutta, 2013) and around 800 innovators who register around fifty patents annually with the relevant international institutions, which is a small number, compared to the number of inhabitants (Domljan, 2013)[1]. There are 84 units engaged in research in development in the country, of which 50% are in higher education, 32.1% in the business sector, 13.1% in the government sector, and 4.7% in the non-profit sector (BiH Agency of Statistics, 2014). 51% of researchers were employed in higher education, 39% in business enterprise sector, 9.7% in government sector in 2012 (BiH Agency of Statistics, 2014). There are 44 institutions of higher education in BiH, of which 26 are universities (8 public and 18 private), and 18 are schools of higher education[2] (16 private and 2 public)[3]. R&D system is highly decentralised, with the complex constitutional structure of BiH delegating policy and funding responsibilities across the entities of Republic of Srpska (RS) and Federation of BiH (FBiH), and Brčko District (BD), as well as across the cantonal structure of policy implementation bodies in FBiH (which does not exist in RS). The 2013 BiH Progress Report indicates that the regulatory environment remains complex and the regulatory burden on small and medium enterprises (SMEs) heavy (EC, 2013a). Main obstacles are in administrative barriers to conducting business across BiH entities, while comprehensive countrywide industrial policy and SME strategy are still not adopted (EC, 2013a). The country made no progress in improving the functionality and efficiency of all levels of government and adopting EU-related legislation (EC, 2013a). Index Mundi BiH Economy Profile 2013[4] considers the high unemployment rate as the most serious macroeconomic problem. Unemployment reached 28.6% in 2012 from 28% a year earlier, with labour shedding continued in large parts of the private sector, in particular in construction, mining and agriculture (EC, 2013a). The EU reduced the IPA (Instrument for Pre-Accession Assistance) funding for BiH in 2013 by €45m (around 52% of total funds) in December 2013, due to country's failure to implement the ruling of the European Court of Human Rights in the Sejdic-Finci case[5]. The lack of an EU coordination mechanism between the State, the Entities and Brčko District for the transposition, implementation and enforcement of EU laws prevents the country to speak with one voice and puts the EU's financial assistance at risk (EC, 2013a)

ERAWATCH Country Reports 2011 and 2012 successively identified five main structural challenges of the national R&I system (Ergarac, 2012; Jahić, 2011a):

*(i)* *increasing domestic demand for R&D,*
*(ii)* *increasing collaboration with the business sector;*
*(iii)* *facilitating knowledge and technology transfer*
*(iv)* *transforming the role of predominantly teaching-oriented universities as largest research performers and*
*(v)* *harmonization of national and entity-level STI strategies' long term goals for R&D funding and corresponding public/private ratio*

[1] According to 2013 BiH Progress Report, the Institute for Intellectual Property of Bosnia and Herzegovina received 60 (national) and 263 (extension) patent applications, 730 trademark applications and 26 industrial design applications.
[2] Colleges which are not part of any university, offering undergraduate studies without a research component.
[3] http://www.cip.gov.ba/index.php?option=com_content&view=article&id=66&Itemid=76&lang=en
[4] http://www.indexmundi.com/bosnia_and_herzegovina/economy_profile.html
[5] http://www.balkaninsight.com/en/article/kosovo-benefits-from-bosnia-s-lack-of-reforms

These challenges remain. The investments in R&D over the past three years have stagnated due to a financial crisis. The Global Competitiveness Report 2013 ranks BiH as 143rd out of the 148 countries in respect to capacity to retain talent and as 140th in respect to capacity to attract talent (Schwab, 2013). There are still no public procurement policies that would set national targets on public procurement of innovative goods and services and include innovation criteria in public tenders. Researchers' Report 2013[6] states that governments in Bosnia and Herzegovina have not promoted any concrete measures encouraging researchers to move from the public to the business sector and vice-versa (Deloitte Consulting, 2013). There is no explicit national policy to promote knowledge transfer at stakeholder level and knowledge transfer activities for university/business platforms. Although the Ministers of science at all governance levels in BiH agreed in 2013 on the general goal that the country should have GERD of 1% GDP by 2015[7], there are still unresolved discrepancies in the targeted GERD and the business enterprise R&D (BERD) share within GERD at the state and entity level[8]. There are significant discrepancies in funding modes between the state and entity level, and a single approach or target in terms of competitive vs. institutional funding between the governance levels cannot be outlined. With the drafting of entity-level STI strategies in 2011 and adoption of the entity-level STI strategy of RS in 2012, the regional aspects are partly addressed within the entity-level boundaries, in comparison with the state-level perspective of the 2009 national STI strategy. Regional aspects in the 2012 entity-level STI Strategy of RS are addressed through a more pronounced role of the five RS Chamber of Commerce regional offices as intermediaries to businesses (Ergarac, 2012).

BiH Progress Report 2013 points out that with respect to integration into the European Research Area, very few actions were taken and that the increase in the level of investment in research was minimal and partial (EC, 2013a). There is some progress in mobility of researchers to address the diaspora[9] and in respect to the Innovation Union, where some work on good practices and instruments for innovation started, but the research infrastructure is very weak (EC, 2013a). Regarding the national progress on Innovation Union commitments, some progress is seen in the areas of strategies for researchers' training and employment conditions, venture capital funds, knowledge market for patents and licensing, safeguarding intellectual property rights and scientific cooperation with third countries. In October 2013 the Western Balkans Regional R&D Strategy for Innovation was adopted, under the joint coordination of the Regional Cooperation Council, the European Commission, and government officials from the region that formed the Steering Committee. The Strategy was financed through a Multi-beneficiary Instrument for Pre-accession Assistance (IPA)[10]. It will run from 2014–2020, with aims to strengthen the region's research capacity, enhance intraregional cooperation, promote collaboration with business sectors, explore possibilities for financing R&D from EU funding schemes and other external sources, and help integrate the region into the European Research Area (ERA) and Innovation Union (World Bank, 2013b).

[6] http://bit.ly/1gMIHNl
[7] http://www.ncp.ba/ba/odrzan-sastanak-ministara-nadleznih-za-oblast-nauke-u-bih.aspx
[8] The 2009 national science, technology and innovation (STI) strategy envisages a 33% share of business enterprise sector in the projected 2015 BiH GERD of 1% BiH GDP. The 2012 entity-level STI strategy of RS envisages the growth of GERD from 0.25% RS GDP in 2010 to 0.5% RS GDP in 2016, with an optimistic projection of BERD of 0.3% RS GDP in 2015 and the goal of reaching GERD of 1% RS GDP by 2020. The draft FBiH STI strategy sets the starting threshold of 1% GDP GERD for gradually increasing the GERD to 2% of GDP by 2020 with suggestion that the government / business sector balance should remain in the pre 1990s war ratio of 2:1 or even 3:1 - 3:1 in duration for at least the first five years of implementation.
[9] Many scientists left Bosnia and Herzegovina due to 1990s war and later brain drain.
[10] More information available at: http://bit.ly/IJJVJY .

Evaluations are limited to the overall improvement of the scientific system and scientific excellence in general sense. There is no international peer review involved and evaluation for institutional funding is not based on excellence in research. There is no strategic alignment of committed national funding at European level. There are no initiatives to remove the legal and other barriers to the cross-border interoperability of national programmes. BiH is not represented in the European Strategy Forum on Research Infrastructures (ESFRI). There are no strategies on smart specialisation in BiH yet. However, the country is represented in the WBC-INCO.Net Coordination of Research Policies with the Western Balkan Countries Project through which the need for smart specialization in South East European Countries is currently promoted[11]

Strategic documents at all levels share the dedication to trans-national cooperation and sharing of information, but the cooperation is limited to bilateral agreements in the field of higher education and scientific research, in which results are visible in cooperation with Slovenia and Montenegro. The creation of an enabling framework for the implementation of the Human Resources Strategy for Researchers (HRS4R) incorporating the implementation of European Charter for Researchers and the Code of Conduct for Recruitment of Researchers is in the phase of promotion to BiH research institutions. Thirteen institutions from BiH have signed the Charter and Code by March 2014. Promotion of women in research profession is also not articulated among the more general gender policies and initiatives on gender mainstreaming cannot be identified in the policy mix. The trans-national access to digital research services for researchers is enabled through West Balkans regional co-operative bibliographic system – COBISS[12] (Co-operative Online Bibliographic Systems and Services). There are no institutions from Bosnia and Herzegovina that have signed the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities[13] and there are is only one open access repository of the institutional/departmental type[14].

[11] More information available at: http://wbc-inco.net/object/news/11348
[12] http://www.cobiss.net/
[13] http://openaccess.mpg.de/319790/Signatories
[14] http://www.openaccessmap.org/list/?q=&country[]=117&project=-1&content=-1

# TABLE OF CONTENTS

# 1 BASIC CHARACTERISATION OF THE RESEARCH AND INNOVATION SYSTEM

Bosnia and Herzegovina (BiH) is located in the Southeast Europe, bordering Croatia to the north and southwest, Serbia to the east, and Montenegro to the southeast. The total area is 51,209 $km^2$ and population is 3.791m[15], accounting for less than 1% of the population of the EU-28 .The country has a complex constitutional structure, set by Dayton Peace Agreement that ended the 1992-1995 war, and is composed of entities of Federation of Bosnia and Herzegovina (FBiH) and Republic of Srpska (RS), and of Brčko District (BD). 2012 GDP was in amount of €13,117m and €3,419 GDP per capita (EC, 2013a). The growth of real GDP in Bosnia and Herzegovina is 0.7% in 2010, 1.0% in 2011 and -1.1% in 2012 (EC, 2013a). Per capita income, measured in purchasing power standards (PPS), decreased in year on year comparison at 28% of the European average in 2012 from 30% in 2011 (EC, 2013a). Unemployment remains very high and reached 28.6% in 2012 from 28% a year earlier (EC, 2013a). The 2012 BiH GERD was €35.57m or 0.27% of country's GDP (BiH Agency of Statistics, 2014). This is the first official figure for BiH GERD, published at the end of January 2014, and it is far below the EU 28 average of 2.06% in 2012. The Ministers of science at all governance levels in BiH agreed in 2013 that the country should have GERD of 1% GDP by 2015[16]. Data on the turnover from innovation is not available in Eurostat or in the national or regional statistics.

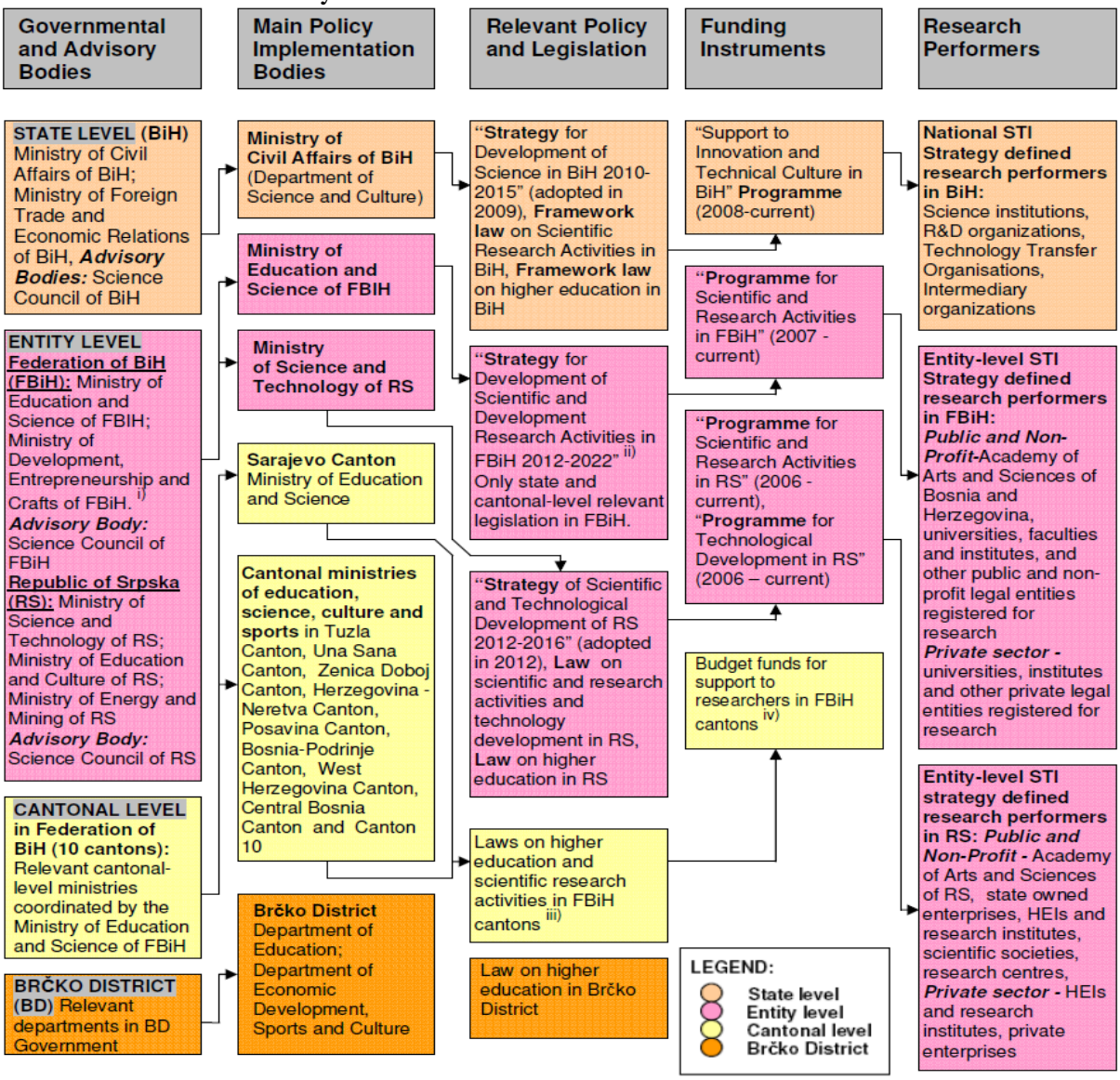
As of March 2014, ENIC Centre BiH lists 44 institutions of higher education in BiH, of which 26 are universities (8 public and 18 private), and 18 are schools of higher education[17] (16 private and 2 public)[18], with a total of 140 faculties and 10 academies (Deloitte Consulting, 2013). There are 24 research institutes in RS (13 public, 10 private and 1 virtual). In FBiH there are 30 institutes; 20 public and 10 private (Deloitte Consulting, 2013). Eight public universities in BiH are the main beneficiaries of competitive research funding, largest being the University of Sarajevo and University of Banja Luka (Jahić, 2011a). BiH is not included in the Innovation Union Scoreboard, but comparable data are partly available in other sources. There are 781.4 researchers per million populations in BiH (Doutta, 2013). EBSCO Host Central & Eastern European Academic Source Database Coverage List[19] shows 21 academic journals from Bosnia and Herzegovina, of which four are in medical sciences, two in mathematics, and two in the area of technology and engineering. There are two indexed journals from Bosnia and Herzegovina in the Web of Science Citation Index Expanded 2013[20] - one in medical sciences and one in the area of technology. There are around 800 innovators who register around fifty patents annually (Domljan, 2013). In 2013 The Institute for Intellectual Property of Bosnia and Herzegovina received 60 (national) and 263 (extension) patent applications, 730 trademark applications and 26 industrial design applications (EC, 2013a).

R&D system is highly decentralized. The state-level Ministry of Civil Affairs of Bosnia and Herzegovina coordinates the BiH science policy and international cooperation through its Department of Science and Culture, and the coordination of small and medium enterprises (SME) policies at the state level is done by the BiH Ministry of Foreign Trade and Economic

[15] http://www.vijeceministara.gov.ba/saopstenja/ministri/default.aspx?id=15955&langTag=en-US
[16] http://www.ncp.ba/ba/odrzan-sastanak-ministara-nadleznih-za-oblast-nauke-u-bih.aspx
[17] Colleges which are not part of any university, offering undergraduate studies without a research component.
[18] http://www.cip.gov.ba/index.php?option=com_content&view=article&id=66&Itemid=76&lang=en
[19] http://www.ebscohost.com/titleLists/e5h-coverage.htm
[20] http://ip-science.thomsonreuters.com/mjl/publist_sciex.pdf

Relations, but the complex constitutional structure of BiH delegates policy and funding responsibilities across the entities of Republic of Srpska (RS) and Federation of BiH (FBiH), and Brčko District (BD), as well as across the cantonal structure of policy implementation bodies in FBiH (which does not exist in RS). The country has a national science, technology and innovation (STI) strategy, adopted in 2009, with the 2010-2015 time frame, which provides directions for R&D funding, but the operational power is distributed to BiH entities which have drafted their entity-level STI strategies with different time frames and different funding targets (see 2.2). This complex structure, including the funding instruments, STI strategies and research performers at different levels, is presented in the following diagram:

**Figure 1: Overview of the governance and funding structure, and performers in the BiH research and innovation system**




i) FBiH entity-level ministries are referred to as "Federal Ministry of…"
ii) Still in draft version - approved by the Government of FBiH in 2012, but is still to be adopted by the FBiH Parliament.
iii) In Sarajevo Canton: Law on Higher Education, Law on Scientific Research Activities and Law on Science Fund; In Tuzla Canton and Zenica-Doboj Canton: Law on Higher Education and Law on Scientific Research Activities; Laws on higher education in cantons: Una -Sana, Herzegovina-Neretva, Posavina, Bosnia - Podrinje, West Herzegovina, Canton 10 and Central Bosnia Canton
iv) Sarajevo Canton, Zenica-Doboj Canton and Una-Sana Canton budget funds for support and publication of master's and doctoral theses and publishing of articles in academic journals. (Including support for scientific and research projects and subscription to academic journals and databases in Sarajevo Canton); Tuzla Canton budget funds for support to science education at the University of Tuzla and co-funding of researchers in presenting their work to public

# 2 RECENT DEVELOPMENTS OF THE RESEARCH AND INNOVATION POLICY AND SYSTEM

## 2.1 National economic and political context

Real GDP in Bosnia and Herzegovina declined by 0.9% in 2012 and the rebound of economic activity began in the first quarter of 2013 and continued in the following months, with industrial production growth of 6.7% in the first quarter, 7.1% in the second quarter and 6.8% in July 2013, with rebound waning in August (EC, 2013b). Unemployment in Bosnia and Herzegovina remains very high and reached 28.6% in 2012 from 28% a year earlier (EC, 2013a). Labour shedding continued in large parts of the private sector, in particular in construction, mining and agriculture, and unemployment was particularly high among the young population; 63.1% for people aged between 15 and 24 (EC, 2013a). Index Mundi BiH Economy Profile 2013[21] considers the high unemployment rate as the most serious macroeconomic problem. Global Doing Business 2014: Smarter Regulations for SMEs ranks BiH as 131st out of 189 countries in the "Ease of Doing Business" rank (World Bank, 2013c). World Bank Bosnia and Herzegovina Partnership Country Snapshot indicates that the business environment in BiH is burdened by a large and complex public administration system and layers of administrative approval authorities, (World Bank, 2013a). IMF aid is necessitated by sharply increased social spending so that the IMF concluded a new Stand-By Arrangement with Bosnia and Herzegovina in October 2012[22]. According to IMF's Mission to BiH September 2013 visit regarding the fourth review under the Stand-By Arrangement, the country's economy is showing signs of recovery, with industrial production and exports increasing, but also indicates that the unemployment remains unacceptably high[23].

The European Commission's BiH Progress report for 2013 indicates that the country made no progress in improving the functionality and efficiency of all levels of government. The Parliamentary Assembly of Bosnia and Herzegovina has made only very limited progress in adopting EU-related legislation (EC, 2013aThe EU reduced the IPA (Instrument for Pre-Accession Assistance) funding for BiH in 2013 by €45m (around 52% of total funds) in December 2013, due to country's failure to implement the ruling of the European Court of Human Rights in the Sejdic-Finci case[24]. The lack of an EU coordination mechanism between the State, the Entities and Brčko District for the transposition, implementation and enforcement of EU laws prevents the country to speak with one voice and puts the EU's financial assistance at risk (EC, 2013a). Until an effective coordination mechanism on EU matters is in place, including the sector policies such as those for agriculture, environment, social policies and social resources management, IPA 2 (2014-2020) programming exercise cannot be launched[25].The Interim Sub-committee meetings on Innovation, Information Society, Social Policy and Public Health, scheduled for June and November 2013 were cancelled by the European Commission due to the inability of the BiH authorities to reach a common position on the topics to be discussed[26]. In response to this, the Delegation of the EU to Bosnia and Herzegovina stressed

[21] http://www.indexmundi.com/bosnia_and_herzegovina/economy_profile.html
[22] Ibid.
[23] http://www.imf.org/external/np/sec/pr/2013/pr13353.htm
[24] http://www.balkaninsight.com/en/article/kosovo-benefits-from-bosnia-s-lack-of-reforms
[25] Ibid.
[26] http://europa.ba/News.aspx?newsid=5999&lang=EN

the urgent need for setting up a functioning EU co-ordination mechanism as a prerequisite for its EU integration process[27].

## 2.2 Funding trends

The 2009 national STI strategy envisaged a 33% share of R&D funding by the business enterprise sector in the projected GERD of 1% of the BiH's GDP by 2015 (BIH Council of Ministers, 2009). Although the Ministers of science at all governance levels in BiH agreed in 2013 on the general goal that the country should have GERD of 1% GDP by 2015[28], there are still unresolved discrepancies in the targeted GERD and the business enterprise R&D (BERD) share within GERD between the state and entity level. The 2012 entity-level STI strategy of RS envisages the growth of GERD from 0.25% of the RS's GDP in 2010 to 0.5% in 2016. The Strategy provides an optimistic projection of the business enterprise expenditure on R&D (BERD) of 0.3% of the RS's GDP in 2015. However, in contrast to the 2009 national STI strategy the goal of increasing GERD to 1% of the RS's GDP is to be achieved by 2020 (RS Government, 2012). The draft FBiH STI strategy stresses the need to act according to the 2006 UNESCO Guidelines for a Science and Research Policy in Bosnia and Herzegovina (Papon & Pejovnik, 2006) and set the starting threshold of 1% GDP GERD for gradually increasing the GERD to 2% of GDP by 2020. Therefore, the draft FBiH Strategy envisaged the GERD of 1% of overall FBiH's GDP already for 2013, with the gradual increase to reach 2% in 2017. The draft FBiH Strategy suggests that the government / business sector balance should remain in the pre 1990s war ratio of 2:1 or even 3:1 - 3:1 in duration of at least the first five years (FBiH Government, 2011)[29].

### 2.2.1 Funding flows

The investments in R&D over the past three years have stagnated due to a financial crisis. R&D funding is to the largest extent performed at the entity level, due to the constitutional structure of the country. In previous years the planned R&D budget in RS (RS Ministry of Science and Technology) was: €2m in 2010, €1.9m in 2011, €1.85m in 2012, and €1.74m in 2013[30]. In FBiH the planned R&D budget of the FBiH Ministry of Education and Science was: €1.6m in 2010, €1.48m in 2011, €1.48m in 2012, and €1.52m in 2013[31]. The overview of R&D funding in FBiH must be complemented with the funding at the cantonal level in FBiH, which does not exist in RS. This is particularly related to Sarajevo Canton where the concentration of R&D performers is the highest, and which provided €0.3m of funding in 2013[32]. Due to a lack of coherent STI statistics across the different governance levels in previous years it cannot be determined to what extent there has been a change in the share provided by different funding sources.

Funding flows for innovation exist at the state and entity level in horizontal support measures.

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[27] Ibid.

[28] http://www.ncp.ba/ba/odrzan-sastanak-ministara-nadleznih-za-oblast-nauke-u-bih.aspx

[29] The FBiH Government approved the redrafted text of the 2011 entity-level STI strategy of FBiH in April 2012. However, prior to the approval of the text by the FBiH Government and its forwarding into parliamentary procedure, the Ministry of Finance of FBiH deemed the projection of budget resources resulting from envisaged GERD of 1% of FBiH GDP in 2013 (€55m) unfeasible within available FBiH budget capacities. The Draft was returned from parliamentary procedure and has not yet been resubmitted (as of March 2014).

[30] http://www.vladars.net/sr-SP-Cyrl/Vlada/Aktivnosti/Budzet/Pages/Arhiva.aspx

[31] http://www.fbihvlada.gov.ba/bosanski/budzet/index.php

[32] http://studomat.ba/univerziteti-u-bih/univerzitet-u-sarajevu/13617/

At the state level "The Support to Innovation and Technical Culture in BiH"[33] measure (€67 thousand allocated in 2013) is administered by the BiH Ministry of Civil Affairs. Horizontal support measures at the entity level are "The Programme for Technological Development in RS"[34] (€189 thousand allocated in 2013), coordinated and managed by the RS Ministry of Science and Technology, and the support to innovators in FBiH in amount of around €50 thousand provided annually through competitive calls by the FBiH Ministry of Trade, Entrepreneurship and Crafts[35].

EUROSTAT does not provide R&D data for BiH and other sources such as Global Innovation Index 2013 (Doutta, 2013), do not report BiH gross expenditure on R&D[36] and other related indicators. The state-level BiH Agency of Statistics and the FBiH Bureau of Statistics did not provide the R&D data for BiH and FBiH until the early 2014, when the first R&D releases were published by both agencies[37]. It was only the RS Bureau of Statistics that published the R&D data in annual releases since 2010, but only for the territory of RS (RS Bureau of Statistics, 2010; 2011; 2012; 2013). Since this report was produced for a third consecutive year in 2012 and for a fourth consecutive year in 2013, it was possible to make a rough estimate of the basic R&D funding indicators for the whole country in ERAWATCH Country Report 2012 (Ergarac, 2012) and in this report. The rough estimate was based on RS GERD per capita value and BiH population index[38], made for comparison per individual years in the following table:[39].

**Table 1: Basic indicators for R&D investments in Bosnia and Herzegovina**

| | 2009 | 2010 | 2011 | 2012 | EU (2012) |
|---|---|---|---|---|---|
| **GDP growth rate** | -2.8 | 0.7 | 1.0 | -1.1 | -0.4 |
| **GERD (% of GDP)** | 0.31 | 0.27 | 0.29 | 0.33 | 2.06 (e) |
| **GERD (euro per capita)** | 9.94 | 8.86 | 10.49 | 11.59 | 525.8(e) |
| **GBAORD - Total R&D appropriations (€ million)** | 8.44 | 8.55 | 6.73 | 7.43 | 86309,5 |
| **R&D funded by Business Enterprise Sector (% of GDP)** | 0.11 | 0.09 | 0.1 | 0.13 | 1.12 (2011) |
| **R&D performed by HEIs (% of GERD)** | 58.5 | 57 | 50 | 51 | 24 |
| **R&D performed by Government Sector (% of GERD)** | 5.6 | 8.13 | 12.23 | 9.6 | 12 |
| **R&D performed by Business Enterprise Sector (% of GERD)** | 35.8 | 34.3 | 36 | 38.2 | 63 |

[33] http://bit.ly/1hkzCtP
[34] http://bit.ly/1fwD6Wj
[35] http://www.fmrpo.gov.ba/ba/stranica/view/grant-5
[36] Although it does not report any value for BiH GERD, Global Innovation Index 2013 indicates a weakness in this category and ranks the country as 107th out of 142 countries.
[37] Which was after the conclusion of the 1st draft of this report in December 2013. The BiH Agency of Statistics release "Research and Development 2012", published on 27/01/2014, is available at: http://www.bhas.ba/saopstenja/2014/NTI_RD_2012_001_01_bos.pdf. The FBiH Bureau of Statistics, published on 03/02/2014, is available at: http://www.fzs.ba/saopcenja/2013/26.1.pdf
[38] RS per capita R&D annual values multiplied by total BiH population annual value, adjusted for RS-specific and FBiH-specific structure of funding and outliers in government, higher education and business sector funding. According to the preliminary results of the 2013 BiH census, the total population of RS is 1,326,991 inhabitants, which makes 35% of the total BiH population of 3,791,622 inhabitants (2013 census preliminary figure).
[39] In making of the rough estimate in 2012 and 2013 ERAWATCH Reports no R&D statistics for Brčko District. was available as well. Brčko District has 93,028 inhabitants, which makes 2.45% of the entire BiH population of 3,791,622 inhabitants (2013 census preliminary figures). Therefore, the lack of data for Brčko District did not affect the rough estimate for the entire country.

| | | | | | |
|---|---|---|---|---|---|
| **Share of competitive vs. institutional public funding for R&D*** | n/a | n/a | n/a | n/a | n/a |
| **Venture Capital as % of GDP (Eurostat table code tin00141)**** | n/a | n/a | n/a | n/a | 0.025 (EU15) |
| | **2009** | **2010** | **2011** | **2012** | **EU (2012)** |
| **Employment in high- and medium-high-technology manufacturing sectors as share of total employment *(Eurostat table code tin00141)** [40]** | n/a | n/a | n/a | 2.15 | 5.6 (2011) |
| **Employment in knowledge-intensive service sectors as share of total employment *(Eurostat table code tsc00012)** [41]** | n/a | n/a | n/a | 36.8 | 38.9 (2011) |
| **Turnover from Innovation as % of total turnover *(Eurostat table code tsdec340)**** | n/a | n/a | n/a | n/a | 13.3 (2008) |

(e) – estimated. * - not available in EUROSTAT. ** - not available in EUROSTAT and national statistics.
Data Source for BiH R&D indicators: rough estimate based on BiH national and regional statistics, except the GDP growth rate (EC, 2013a). Data Source for EU average: EUROSTAT

According to the BiH Agency of Statistics release "Research and Development 2012" with R&D data for 2012, published at the end of January 2014, the official BiH GERD in 2012 was €35.57m or €9.38 per capita (0.27% of GDP). BERD was €20.7m and made 0.16% of GDP or 58% of GERD, in comparison with 26% of GERD performed by HEIs and 14% of GERD performed by government sector (BiH Agency of Statistics, 2014). Rising trend of BERD was indicated since 2010 in the rough estimate presented in the table above, and the sharp rise of BERD in 2012 is due to an increase in business sector R%D funding from abroad in 2012. The RS Bureau of Statistics release with R&D data for 2012, on which the 2012 rough estimate was based, indicated the increase in BERD (in RS) in 2012, stating that the highest share of funds for R&D was intended for the Frascati Manual 2002[42] activity group "Exploration and exploitation of the Earth"; 53.8% (RS Agency of Statistics, 2013), compared to 25.7% in 2011 (RS Agency of Statistics, 2012). The recent BiH Agency for Statistics release with data for 2012 also points out that the highest allocation is in the Frascati Manual 2002 group activity "Exploration and exploitation of the Earth" – 26.6% (BiH Agency of Statistics, 2014). Since the BiH Agency of Statistics R&D release has first been published in January 2014, there are no data for comparison with previous years, but the RS Bureau of Statistics annual releases indicate that the funding from abroad in business sector was 35% of total business sector R&D funding in 2011 (RS Agency of Statistics, 2012) and then almost doubled to 69% of the total business sector R&D funding in 2012 (RS Agency of Statistics, 2013)[43].

## 2.2.2 Funding mechanisms

### 2.2.2.1 Competitive vs. institutional public funding

Competitive funding is administered through the state and entity-level horizontal support measures, but since there are significant discrepancies in funding modes between the state and

[40] The 2012 value is a percentage calculated from the sum of employment figures per NACE Rev. 2 in the RS Bureau of Statistics annual bulletin "Wages, Employment and Unemployment, 2013" (http://bit.ly/1iaDgrB) and FBiH Institute for Statistics annual bulletin "Employment, Unemployment and Wages in FBiH, 2013" (http://bit.ly/195oY6x). It was not possible to calculate the percentage for 2009, 2010, and 2011, because FBiH and RS annual bulletins are comparable per NACE codes only since aforementioned 2013 editions (data for 2012). State-level BiH Agency of Statistics annual Labour Force Surveys (http://bit.ly/1i8roGw) use NACE Rev. 1.1 and Rev. 2 cumulatively and only within the general categories - agriculture, industry, and services.
[41] Ibid.
[42] http://bit.ly/1gnhb3b
[43] Which precisely corresponds to 69% of funding from abroad of the total business sector R&D funding in 2012 in FBiH, as indicated in the FBiH Bureau of Statistics release "Research and Development 2012", published on 03/02/2014 (http://www.fzs.ba/saopcenja/2013/26.1.pdf) . However, since this is the first R&D release by the FBiH Bureau of Statistics, it is not possible to compare this value with previous years.

entity level, and a lack of consolidated data, a single approach or target in terms of competitive vs. institutional funding between the governance levels cannot be outlined in relation to government budget appropriations or outlays for R&D (GBAORD)[44]. The development of institutional assessment and formal evaluation of the institutional funding requires a change in research policy that was already identified in ERAWATCH Country Report 2011 as mainly generic in character and aimed for maintaining the balanced development of the main research fields through horizontal support measures, while a comprehensive and performance-based evaluation is absent (Jahić, 2011a).

The state-level Ministry of Civil Affairs distributes its annual budget (€0.3m in 2013) for support to innovators and for support to research organisations submitting FP7 proposals entirely through competitive calls. However, the R&D funding is to the largest extent provided at the entity level (€1.52m planned budget of the FBiH Ministry of Education and Science and €1.74m planned budget of the RS Ministry of Science and Technology in 2013).

The two entities have established separate policies and legislation. The FBiH Ministry of Education and Science allocates grants through open calls for research organisations in FBiH, with awarding criteria mostly being the soundness of the rationale, demonstrated need for support, budget plan or results to date (Branković & Branković, 2013). Over the past three years the planned budget item for transfers in the area of science of importance to FBiH (which includes annual public competitive calls for scientific and development research projects, support to graduate and postgraduate students, support to research of importance to FBiH, and scientific publishing and organisation of conferences) was around 65% of the total budget, vs. around 35% in the budget item for transfers to science institutions[45]. The RS Ministry of Science and Technology publishes an annual public call for proposals and evaluates the quality of the proposals, including the justification of the budget proposed and the quality of the research team and the institution (Branković & Branković, 2013). The planned budget item for projects and programme activities of scientific institutions, projects for promotion of science and project activities in the area of technology in 2013 (which includes annual public competitive calls for scientific research projects and international cooperation, scientific publishing and organisation of conferences, support to innovators and technology development projects) was around 70% of the total budget, vs. around 30% in the planned budget item for direct transfers to science institutions[46]. This share changed in favour of direct transfers to science institutions by 10% over the past three years[47]. Recent research in the area of higher education policies shows that allocation mechanisms in place are input-based and incremental and they cover the operating costs of HEIs, with more than 80% of budget allocation ending up as staff salaries (Branković & Branković, 2013).

#### 2.2.2.2 Government direct vs. indirect R&D funding

Most of the research institutions are public institutions within the university structure. and they are entitled to some tax exemptions like all other public and not-for-profit organisations, but there is nothing to support R&D specifically (Jahić, 2011a). The only incentives that may indirectly support R&D are exemptions from custom duties and value added tax refunds (Jahić, 2011a). There is no change in this trend, while government subsidies for innovation also lack. OECD's "Private Sector Development Policy Handbook: Triple Helix Partnerships for

[44] BiH GBAORD is still available only as a rough estimate (see 2.2.1).
[45] http://www.fbihvlada.gov.ba/bosanski/budzet/
[46] http://www.narodnaskupstinars.net/upload/documents/lat/budzet_republike_srpske_za_2013._godinu.pdf
[47] http://www.vladars.net/sr-SP-Cyrl/Vlada/Aktivnosti/Budzet/Pages/Arhiva.aspx

Innovation in Bosnia and Herzegovina" presented the results of a business survey of 150 enterprises from the agri-food sector of Bosnia and Herzegovina which was conducted in March 2011. The survey showed that 79% of firms have received no subsidies for their innovation activities and that international funds supporting innovation and research activities are not fully exploited in Bosnia and Herzegovina (OECD, 2013). The country is included in the Western Balkan Enterprise Development and Innovation Facility (WB EDIF)[48] that promotes the emergence and growth of innovative and high-potential companies (see 4.2). However, there are no national programmes that would span over the entire process of value creation. Venture and seed capital mechanisms for start-ups (see 4.1) do not address innovative companies separately. Additional resources from Entrepreneurship and Innovation Programme (EIP) were not used (see 4.3).

### 2.2.3 Thematic versus generic funding

ERAWATCH Country Reports 2011 and 2012 indicated that the main policy instruments for financing scientific research (programmes for scientific and research activities) follow a horizontal approach to assure the balanced development of the six main fields of science: agricultural sciences, natural sciences, engineering and technology, medical and health sciences, social sciences and humanities (Ergarac, 2012; Jahić, 2011a). According to the overview of R&D resources provided by the government sector by activity groups from the Frascati Manual 2002[49], the activity group Exploration and exploitation of Earth made 26.6% of the 2012 GERD of €35.57m, followed by General advancement of knowledge: 17.1%; Industrial production and technology: 15%; Health: 14.83%; Transport, telecommunications and other infrastructures: 8.73%; Energy: 6.62%; Environment: 3.96%; Culture, recreation, religion and mass media: 2.23%; Education: 0.76%; Political and social systems, structures and processes: 0.63% (BiH Agency of Statistics, 2014).

### 2.2.4 Innovation funding

Innovation funding, including the research funding that can be used for innovation makes less than 10% of total allocations for R&D at all governance levels in 2013 (see 2.2.1). At the state-level, a change due to state-level budget alterations and delays occurred in the "Support for Innovation and Technical Culture in BiH" Programme, administrated by the Ministry of Civil Affairs through its Department of Science. The Programme had a planned budget of €0.25m in 2010 for funding BiH research organisations to submit proposals for the Seventh Framework Programme (FP7) projects and €76 thousand for grants that support innovation and technical culture in BiH. No allocation was made in 2011, and the program was continued in 2012, with the total of €67 thousand allocated in 2012 and 2013. The 2011 and 2012 budget did not allocate the resources in the budget item for FP7 project preparation. Instead, the 2012 annual call for funding of projects that support innovation and technical culture in BIH included this category in the provided €67 thousand budget[50]. In 2013 the items were again separated in the budget and €0.23m for funding BiH research organisations to submit proposals in FP7 was again available as a separate call[51]. However, there is no increase of the budget for innovation activities, which is also the case at the entity level where there is no increase in support to innovators in FBiH, where around €50 thousand are provided annually through competitive calls by the FBiH

[48] http://www.eif.org/what_we_do/guarantees/news/2012/wbedif.htm
[49] http://bit.ly/1gnhb3b
[50] http://www.mcp.gov.ba/org_jedinice/sektor_nauka_kultura/konkursi/?id=3446
[51] http://www.mcp.gov.ba/org_jedinice/sektor_nauka_kultura/konkursi/default.aspx?id=4163&langTag=bs-BA

Ministry of Trade, Entrepreneurship and Crafts[52]. The entity-level "Programme for Technological Development in RS"[53], administered by the RS Ministry of Science and Technology, decreased the budget for innovators from €197 thousand in 2012 to €189 thousand in 2013.

## 2.3 Research and innovation system changes

Geographical areas of the country are divided between the entity and cantonal-level jurisdictions. With the drafting of entity-level STI strategies in 2011 and adoption of the entity-level STI strategy of RS in 2012, the regional aspects are partly addressed within the entity-level boundaries, in comparison with the state-level perspective of the 2009 national STI strategy (see 4.4.). Regional aspects in the 2012 entity-level STI Strategy of RS are addressed through a more pronounced role of the five RS Chamber of Commerce regional offices as intermediaries to businesses (Ergarac, 2012). In 2013 the RS Chamber of Commerce joined the Agreement on Establishing the Business Friendly Network of RS with Association of Local Authorities of RS and EDA Development Agency from Banja Luka[54]. The Network was established for the local self-government level in RS, within the Business Friendly Certification South East Europe (BFC SEE) process[55], and with a goal for the Network to become a member of the Regional Business Friendly Network in South East Europe[56]. The counterpart entity-level network from FBiH in the process is the Network for Local Economic Development in FBiH, established in 2013 by the FBiH Ministry of Trade, Entrepreneurship and Crafts, FBiH Chamber of Commerce, four regional development agencies in FBiH, and Association of Towns and Municipalities of FBIH[57].

## 2.4 Recent Policy developments

On June 6th 2013, ministers of science from all governance levels in BiH met in Sarajevo to exchange information on STI strategies at all levels, implementation of relevant legislation, STI statistics and coordination between different ministries. Ministers agreed on the general goal that the country should have GERD of 1% GDP by 2015, and expressed the commitment to improve the coordination between ministries at different levels, strengthen the institutional capacities and participate in Horizon 2020[58]. GERD of 1% BiH GDP by 2015 is justified through intended "change in understanding of science" and "spending in this area not viewed as expenditure, but as investment", as stated at the meeting in Sarajevo[59]. However, this meeting did not produce a change or addition to goals or instruments in existing STI strategy in RS or in the draft version of the FBiH STI strategy. There is no indication of a follow-up or a public debate involving stakeholders from public and private sector. In addition, the situation with the delayed adoption of draft FBiH entity-level STI strategy in the FBiH Parliament has not been resolved (see 2.2). This strategy was the first testing ground for introduction of GERD of 1% GDP. With the FBIH entity-level STI strategy still without parliamentary approval, and with entity-level RS STI strategy oriented towards the goal of GERD of 0.5 % GDP by 2015, and GERD of 1% GDP only by 2020, the mechanisms for adjusting this to national STI strategy goal of 1% GDP GERD by 2015 remain unclear.. In addition to this, the entity-level STI strategy of RS envisages

[52] http://www.fmrpo.gov.ba/ba/stranica/view/grant-5
[53] http://bit.ly/1fwD6Wj
[54] More information available at: http://bit.ly/19vtNJa.
[55] http://www.bfc-see.org
[56] More information available at: http://bit.ly/1kSJYST
[57] More information available at: http://fipa.gov.ba/novosti/vijesti/default.aspx?id=3786&langTag=en-US.
[58] http://www.ncp.ba/ba/odrzan-sastanak-ministara-nadleznih-za-oblast-nauke-u-bih.aspx
[59] Ibid.

a much larger share of BERD in GERD in comparison to its entity-level counterpart STI strategy in FBiH and national STI strategy (see 2.2).

In October 2013 the science ministers from Albania, Bosnia and Herzegovina, Croatia, Kosovo, FYR Macedonia, Montenegro, and Serbia adopted the Western Balkans Regional R&D Strategy for Innovation, which was supported by the World Bank and the European Commission, and was financed through a Multi-beneficiary Instrument for Pre-accession Assistance (IPA)[60]. The European Commission and the Regional Cooperation Council oversaw the implementation of the project[61]. The Strategy, which will run from 2014–2020, aims to strengthen the region's research capacity, enhance intraregional cooperation, promote collaboration with business sectors, explore possibilities for financing R&D from EU funding schemes and other external sources, and help integrate the region into the European Research Area (ERA) and Innovation Union (World Bank, 2013b). The Strategy is envisaged as a development product to be supported by the donor community in amount of €200m, in areas of large-scale research grants involving at least two countries in the region, grants for research projects led by young scientists, setting up four networks of excellence in aquaculture, agriculture, renewable energy and nanotech for health, linking science with industry and funding early stage start-ups (Tatalović, 2013).

## 2.5. Recent evaluations, consultations, foresight exercises

ERAWATCH Country Report 2011 indicated that the overall evaluation culture in BiH science and research system is weak (Jahić, 2011a). Evaluations are of administrative nature and performed for the administrative needs of ministries in charge. There is no international peer review involved. In RS public research institutes are subject to external evaluation by a committee appointed by the Minister of Science and Technology every three years, while private ones are evaluated only for the publicly funded part of their activities (Branković & Branković, 2013). A similar evaluation of research organisations in FBiH is not in place, but in both entities quality is also assessed at the project level, in the case of projects supported by the entity ministry (Branković & Branković, 2013).

With higher education being the largest R&D performer in Bosnia and Herzegovina, evaluations and consultations related to research are almost exclusively within the framework of higher education reform in accordance with the Bologna Process. The STI evaluations in BiH should therefore be viewed in close relationship with evaluations performed in higher education sector. The state-level Agency for Development of Higher Education and Quality Assurance of Bosnia and Herzegovina (HEA)[62] was established in 2008 and, through public debates and consultations, it produced a set of standards and rules for accreditation, with attention to strengthening of research, researchers' mobility and scientific publishing[63]. HEA started the process of appointing the committees of domestic and international experts for evaluation of HEIs and issuing of recommendations for their accreditation in 2012. In 2013 the first recommendations for accreditation were issued to agencies and bodies at different governance levels in charge in the process[64]. First accreditations were made in RS, and in FBIH the cantonal laws were amended in preparation for the accreditation process . The accreditation is finalised

[60] More information available at: http://bit.ly/IJJVJY .
[61] Ibid.
[62] http://www.hea.gov.ba
[63] Available at: http://hea.gov.ba/Dokumenti/dokumenti_agencije/?id=3065 (Only in Bosnian/Croatian/Serbian)
[64] Apart from the agency at the state level - HEA, in 2011 the Republic of Srpska established its own agency for accreditation - Higher Education Accreditation Agency of the Republic of Srpska (HEAARS) (http://www.heaars.com/en/indexen.html), which coordinates its activities with HEA.

with the entry in the National Register of Accredited HEIs in Bosnia and Herzegovina, which HEA is in charge of, and based on which the List of Accredited HEIs is compiled[65]. The entry of the first accredited HEIs (five) was made in November 2013[66].

In May 2013 OECD's "Private Sector Development Policy Handbook: Triple Helix Partnerships for Innovation in Bosnia and Herzegovina" was published. As part of its RCI pilot project[67], Bosnia and Herzegovina requested assistance with the implementation of Triple Helix Partnerships. The decision to seek OECD support on this topic came as a result of a roundtable meeting on 21 October 2010 in Sarajevo bringing together members of the business community, researchers, government officials and the OECD Investment Compact[68] (OECD, 2013). This Handbook summarises the results of this RCI project and presents results of a business survey of 150 enterprises from the agri-food sector of Bosnia and Herzegovina which was conducted in March 2011. The survey examined the different aspects of firms' approaches to innovation, and co-operation in the agri-food sector of Bosnia and Herzegovina (OECD, 2013).

In June 2011, the World Bank signed an agreement with the European Commission to provide technical assistance for the development of the Western Balkans Regional R&D Strategy for Innovation, which was implemented between December 2011 and October 2013 under the joint coordination of the Regional Cooperation Council, the European Commission, and government officials from the region that formed the Steering Committee (World Bank, 2013b). This team was joined by representatives of leading universities, research institutes, and the business sector, and the participant entities, including those from BiH, were visited by the World Bank team between January and June 2013 as part of a broader consensus-building effort (World Bank, 2013b). The results of that consultation process, which involved representatives of core policy-making organisations, are incorporated into the Strategy adopted in October 2013.

## 2.6. Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3)

There are no strategies on smart specialisation in BiH yet. However, the country is represented in the WBC-INCO.Net Coordination of Research Policies with the Western Balkan Countries Project through which the need for smart specialization in South East European Countries is currently promoted[69]. Participants from Bosnia and Herzegovina took part at the two-day training event on smart specialisation that took place from 11-12 April in Belgrade, Serbia, co-organised by the Mihajlo Pupin Institute (MPI) from Serbia, by Centre for Social Innovation (ZSI) from Austria and by the South East European Research Centre (SEERC) from Greece and supported financially by the Central European Initiative (CEI)[70]. The training addressed the practical implementation of smart specialisation definition processes, with emphasis on broader than national analysis of the background conditions, with individual countries considered as an integral part of the wider regional context with all possibilities and challenges[71].

[65] http://www.hea.gov.ba/akreditacija_vsu/Default.aspx
[66] More information available at: http://hea.gov.ba/Aktuelnosti/Default.aspx?id=4423.
[67] Regional Competitiveness Initiative (RCI). RCI's goal is to assist with the design of sustainable economic policies on innovation and human capital development. Between 2010 and 2013, the RCI led pilot projects in seven Western Balkan economies. More information available at: http://wbc-inco.net/object/news/2918 .
[68] http://www.oecd.org/investmentcompact/
[69] More information available at: http://wbc-inco.net/object/news/11348.
[70] More information available at: http://wbc-inco.net/object/news/12041.
[71] Ibid.

Together with Austria, Hungary, Czech Republic, Slovakia, Slovenia, Bulgaria, Romania, Croatia, Serbia, Montenegro, Ukraine and Moldova, Bosnia and Herzegovina is part of the Danube Region, for which the EU Strategy was launched in 2011, together with the "Scientific Support to the Danube strategy" initiative launched in November 2011 by the European Commission's Joint Research Centre (JRC)[72]. It focuses on 4 priorities: environment protection, irrigation & agricultural development, navigability and energy production, addressing aspects of smart specialisation in the Danube Region. The first High Level Conference on Scientific Support to the Danube Strategy was held on 24/04/2012[73] and the second on 16/05/2013[74].

The Western Balkans Regional R&D Strategy for Innovation which was adopted in October 2013 (see 2.4) envisages a program to encourage the development of *networks of excellence* in areas consistent with the smart specialization of the region, increasing the rationalization in resource use, and focusing research on areas with greater economic impact (World Bank, 2013b). The Strategy envisages a combination of a strong regional research capacity with immediate economic potential, consistent with the notion of smart specialization in the areas of renewable energy, aquaculture, and marine culture fields; in applications of general purpose technologies (nanotechnology and biotechnology) to specific fields of economic activity (such as agriculture and health); and some fields of biological sciences and chemistry in which the region shows a higher scientific performance (World Bank, 2013).

[72] More information available at: http://europa.eu/rapid/press-release_IP-11-472_en.htm.
[73] More information available at: http://bit.ly/1frv2tZ .
[74] More information available at: http://bit.ly/1boXW6G.

# 3 PERFORMANCE OF THE NATIONAL RESEARCH AND INNOVATION SYSTEM

## 3.1 National Research and Innovation policy

It is difficult to position Bosnia and Herzegovina in the EU context due to the fact that country is not included in sources such as the Innovation Union Competitiveness Report[75] and the Innovation Union Scoreboard[76]. The indicative data can partly be obtained in combination of available international sources and national statistics.

**Table 2**

| | |
|---|---|
| **HUMAN RESOURCES** | |
| New doctorate graduates (ISCED 6) per 1000 population aged 25-34 | - |
| Percentage population aged 25-64 having completed tertiary education | - |
| **Open, excellent and attractive research systems** | |
| International scientific co-publications per million population | - |
| Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country | - |
| **Finance and support** | |
| R&D expenditure in the public sector as % of GDP | 0.21 |
| **FIRM ACTIVITIES** | |
| R&D expenditure in the business sector as % of GDP | 0.12 |
| **Linkages & entrepreneurship** | |
| Public-private co-publications per million population | - |
| **Intellectual assets** | |
| PCT patents applications per billion GDP (in PPS€) | *[77] |
| PCT patents applications in societal challenges per billion GDP (in PPS€) (climate change mitigation; health) | - |
| **OUTPUTS** | |
| **Economic effects** | |
| Medium and high-tech product exports as % total product exports | 18.76[78] |
| Knowledge-intensive services exports as % total service exports | - |
| License and patent revenues from abroad as % of GDP | **[79] |

**Data source: BiH national statistics and Global Innovation Index**

n/a – not available for individual year in existing international databases or national statistics

* - available in comparable source in similar category / different standard

** - within a wider category in existing international databases or national statistics

\- - no data in international databases or BiH national or regional statistics

Domestic demand for R&D is weak due to the post 1990s war reestablishment of BiH economy in natural resources and unskilled labour-intensive industries, including the concentration of

[75] http://ec.europa.eu/research/innovation-union/index_en.cfm?section=competitiveness-report&year=2011

[76] http://ec.europa.eu/enterprise/policies/innovation/files/ius-2011_en.pdf

[77] BiH Domestic Resident and PCT patents applications / bn GDP PPP$ are listed in Global Innovation Index 2013 (Domestic Resident: 1.4, PCT: 0.3 in 2012/2013), available at: http://bit.ly/1c9k2Ok.

[78] http://www.bhas.ba/tematskibilteni/robna%20bos.pdf

[79] Royalty and license fees receipts / % of service exports are listed in Global Innovation Index 2013 (1% in 2012/2013), available at: http://www.globalinnovationindex.org/content.aspx?page=GII-Home.

research almost exclusively at universities, with many experts leaving BiH. The Global Competitiveness Report 2013 ranks BiH as 143rd out of the 148 countries in respect to capacity to retain talent and as 140th in respect to capacity to attract talent (Schwab, 2013). There are 781,4 researchers per million populations in BiH (Doutta, 2013). Scientific research capacities are mostly located at universities, but due to the lack of funding, the universities do not fully perform their research role and they are mainly focused on their teaching role (BiH Council of Ministers, 2009). There are 84 units engaged in research in development in the country, of which 50% are in higher education, 32.1% in the business sector, 13.1% in the government sector, and 4.7% in the non-profit sector (BiH Agency of Statistics, 2014). BiH Progress Report 2013 points out that with respect to integration into the European Research Area, very few actions were taken and the increase in the level of investment in research was minimal and partial (EC, 2013a). There is some progress in mobility of researchers to address the diaspora and in respect to the Innovation Union, where some work on good practices and instruments for innovation started (EC, 2013a). Participation in COST and EUREKA in 2013 was relatively good[80] and the efforts to promote cooperation under FP7 were stepped up with support from the Austrian Development Agency, resulting in a higher number of submissions and selected projects but overall the success rate (about 13%) is still very low (EC, 2013a). According to data from NCP (National Contact Point) BiH, institutions from BiH are currently using around €3m in ongoing FP7 projects, with Ministry of Civil Affairs of BiH participating in four projects, and in the coordinator role in one (Masnik-Ćulahović, 2013). The administrative capacity is very weak and there is a serious lack of coordination between stakeholders (EC, 2013a).

## 3.2 Structural challenges of the national R&I system

ERAWATCH Country Reports 2011 and 2012 successively identified five main structural challenges of the national R&I system: *(i) increasing domestic demand for R&D, (ii) increasing collaboration with the business sector; (iii) facilitating knowledge and technology transfer*, *(iv) transforming the role of predominantly teaching-oriented universities as the largest research performers and (v) harmonization of national and entity-level STI strategies' long term goals for R&D funding and corresponding public/private ratio* (Ergarac, 2012; Jahić, 2011a): These challenges remain. The investments in R&D over the past three years have stagnated due to a financial crisis. There are still no public procurement policies that would set national targets on public procurement of innovative goods and services and include innovation criteria in public tenders. Recent changes and improvements in public procurement legislation still do not address demand-side innovation policy measures. The latest R&D statistics show 51% of researchers employed in higher education, 39% in business enterprise sector in BiH, and 9.7% in government sector in 2012 (BiH Agency of Statistics, 2014). Researchers' Report 2013 states that governments in Bosnia and Herzegovina have not promoted any concrete measures encouraging researchers to move from the public to the business sector and vice-versa (Deloitte Consulting, 2013). There is no explicit national policy to promote knowledge transfer at stakeholder level and knowledge transfer activities for university/business platforms. The 2013 BiH Progress Report indicates that reliable statistics to establish expenditure on research from both the public and private sectors are still missing and the research infrastructure is very weak (EC, 2013a). There are about 800 innovators who register around fifty patents annually with the relevant international institutions, which is a small number, compared to the number of inhabitants (Domljan, 2013). Although the Ministers of science at all governance levels in BiH agreed in 2013 on the general goal that the country should

[80] In March 2014 COST Country Info (http://www.cost.eu/about_cost/cost_countries?countrycode=BA) showed BiH involved in 72 COST actions with COST economic dimension of around €4.3b. EUREKA NIP BiH (http://www.eurekanetwork.org/bosnia-herzegovina/search) showed participation of BiH in two finished projects (total project cost €33.03m) and two ongoing (total project cost €1.62m).

have GERD of 1% GDP by 2015, there are still unresolved discrepancies in the targeted GERD and the BERD share within GERD at the state and entity level (see 2.2).

## 3.3 Meeting structural challenges

The weakness of the private sector in combination with a lack of harmonized approach in revitalization of its R&D performance is the biggest obstacle in addressing the structural challenges as a whole. IPA Multi-annual Indicative Planning Document (MIPD) 2011-2013 indicated that further efforts are needed to properly implement the state-level strategy for SMEs. The entities' support measures for SMEs are not harmonised which reduces their positive effects, while SMEs are operating under different conditions across the country (EC, 2011). Sector objectives are to improve the institutional and legal framework, coordination and harmonisation of SMEs related public policies, support Bosnia and Herzegovina to adhere to its obligations under the IA/SAA, advance the implementation of the Small Business Act, strengthen the business support infrastructure and services, reduce the share of public expenditure to GDP and the reduction of administrative burdens to doing business, stimulate the innovation by SMEs and increase competitiveness in growth sectors (EC, 2011). However, there was little progress in the area of industrial and SME policies, with comprehensive countrywide industrial policy and SME strategy still to be adopted (EC, 2013a). The regulatory environment remains complex and the regulatory burden on SMEs heavy, with obstacles and administrative barriers to conducting business across BiH entities (EC, 2013a).

**Table 3**

| Challenges | Policy measures/actions addressing the challenge | Assessment in terms of appropriateness, efficiency and effectiveness |
|---|---|---|
| 1. Increasing domestic demand for R&D | There is a lack of demand-side innovation policy measures in BiH, such as the lack of innovation procurement section in the Strategy for Development of Public Procurement System in BiH 2010-2015. | There are still no public procurement policies that would set national targets on public procurement of innovative goods and services and include innovation criteria in public tenders. |
| 2. Increasing collaboration with the business sector | The policy mix in BiH addresses the SME / public sector with particular attention given to intermediaries in the 2012 entity-level STI strategy of RS. Reforms have been initiated towards introduction of a countrywide unified business register and one-stop shops to simplify doing business in both Entities (EC, 2013a) | SME Consultative Committee is still not fully operational (EC, 2013a). The SME Council for Development and Promotion of Entrepreneurship continues to be inactive (EC, 2013a). "One-stop shop" system for businesses was introduced at the end of 2013 (in RS). |
| 3. Facilitating knowledge and technology transfer | The 2009 national STI strategy aims to stimulate scientific excellence and enable the transfer of knowledge and results of scientific discoveries to industry and business through establishment of science and technology parks. The 2012 entity-level STI strategy of RS follows on this, but this challenge is closely tied with the private sector weakness and HEIs as the largest research performer. | The rationale for establishment of science and technology parks in terms of regional aspects is different at the national and at the entity level. There is no unified system for assessing the sector quality and inter-sectoral dimension. Global Innovation Index Report 2013 ranks BiH as 66th out of 142 ranked countries in knowledge diffusion (Doutta, 2013). |
| 4. Transforming the role of predominantly teaching-oriented universities | Partnerships between HEIs and business enterprise sector have been promoted in strategy documents, including higher quality an easier public support to research and innovation in business (RS Government, 2012). | There is no data on the inward mobility of researchers. Global Innovation Index Report 2013 ranks BiH as 46th in university/industry collaboration out of 142 ranked countries (Doutta, 2013). |
| 5. Harmonisation of STI strategies' long term goals for | On June 6th 2013, ministers of science from all governance levels in BiH agreed on the1% GDP goal for BiH GERD by 2015. | There are still differences in the targeted share of business enterprise sector in GERD between the national and entity |

| | | |
|---|---|---|
| R&D funding | | strategies (see 2.2). |

# 4 NATIONAL PROGRESS IN INNOVATION UNION KEY POLICY ACTIONS

## 4.1 Strengthening the knowledge base and reducing fragmentation

**Promoting excellence in education and skills development**

BiH does not have statistical data on the inward and outward mobility of researchers. Global Innovation Index Report 2013 indicates the weakness of Bosnia and Herzegovina in QS university ranking, placing the country at 68th position out of 142 countries (Doutta, 2013). As of March 2014, ENIC Centre BiH reports 44 licensed institutions of higher education in Bosnia and Herzegovina[81]. Out of that, there are 8 public and 18 private universities and 18 independent colleges (16 private and 2 public). In September 2013, the RS Government announced the rationalisation of the network of higher education institutions, stating that RS "produces too many university graduates that cannot find employment"[82]. For that aim the RS Government formed a Work Group that will try to provide answers to questions related to higher education and science and link between the higher education and labour market[83]. The Work Group is led by the Prime Minister of RS and ministers of science and technology and education and culture, with participation of rectors of two public universities in RS – University of Banja Luka and University of East Sarajevo, and representatives from Rectors' Conference of RS, relevant government bodies and agencies, RS Chamber of Commerce and RS Students' Union[84]. EU funded twinning project "Strengthening Institutional Capacity for Quality Assurance" was launched in October 2013, with the overall objective of the project is to contribute to increased mobility and employability of the labour force through improvement of the quality of higher education institutions in line with the Bologna Process. The project is a partnership between Bosnia and Herzegovina and Austria, funded by the EU under the Instrument for Pre-Accession Assistance (IPA 2011) in the amount of €1m for the period of two years[85]. The main partner for the project implementation is the Agency for Development of Higher Education and Quality Assurance of BiH (HEA), while other partners are the BiH Ministry for Civil Affairs, entity and cantonal ministries of education, the Education Department in the Government of Brčko District of Bosnia and Herzegovina, and the Agency for Accreditation of Higher Education Institutions of the Republic of Srpska (HEAARS).

There are initiatives for new curricula addressing innovation skills gaps in the country and structured third-cycle studies. The 2012 document "Strategic Directions for Development of Higher Education in FBiH 2012-2022"[86], produced by the Ministry of Education and Science and FBiH, provides support for development of quality management of doctoral studies, in anticipation of standards and guidelines set through the TEMPUS project "EQADE - Embedding Quality Assurance in Doctoral Education"[87], aimed at addressing current problems and defining strategic directions of doctoral studies at public universities in Bosnia and

[81] http://www.cip.gov.ba/index.php?option=com_content&view=article&id=66&Itemid=76&lang=en
[82] http://www.nezavisne.com/novosti/bih/Cvijanovic-Proizvoditi-kadar-koji-ce-naci-zaposlenje-210638.html
[83] Ibid.
[84] Ibid.
[85] More information available at: http://bit.ly/1kmGeHq
[86] http://bit.ly/1dROEU8
[87] More information available at: www.wus-austria.org/project/0/89.html.

Herzegovina. The coordinator of the project (2011-2014) is the University of Heidelberg, Germany, with the support from the WUS Austria Agency Office in Sarajevo. Within the project, the "Roadmap for the Introduction of PhD Studies at the University of Sarajevo" was presented on October 4th 2013 at the Rectorate of the University of Sarajevo[88]. The 2012 RS STI strategy envisages the establishment of interconnected, open and networked doctoral studies with increase in number of full-time employed doctoral students, and organisation of joint and dual doctoral studies until 2016 (RS Government, 2012). This is in addition to already existing "Guidelines for the Development of the Code of Rules for the Doctoral Studies and for Obtaining the Doctorate Degree at Universities in Republic of Srpska"[89], produced by the RS Ministry of Education and Culture in 2008. These guidelines are in line with the European standards for quality assurance (Deloitte Consulting, 2013).

At the national level, the BiH Ministry of Civil Affairs participates in the FP7 (Capacities) WBC-INCO.NET project[90] (Co-ordination of Research Policies with Western Balkan Countries), a regional consortium project with the aim of supporting research and innovation cooperation and enhanced integration of the Western Balkan Countries (WBCs) in the ERA. The EURAXESS BiH Portal[91] provides information on the life and work in Bosnia and Herzegovina, offering assistance for incoming and outgoing mobility of researchers and their families. Researchers' Report 2013 indicates that BiH legislation has not yet recognised the BiH EURAXESS portal as a place for obligatorily publishing researcher job vacancies, which are published only on a voluntary basis (Deloitte Consulting, 2013). The Report points out that more intensive promotional activities need to take place to promote the BiH EURAXESS portal as a place available for job postings. The BiH Ministry of Civil Affairs, NCP BiH and EURAXESS BiH promote the signing of the European Charter for Researcher and the Code of Conduct for Recruitment of Researchers with support from WebInUnion Project[92] and Austrian Development Agency. WebInUnion Project goals are to meet the expectations # 1 and # 4 from European "Innovation Union" strategy - to promote attractive conditions in the work environment promoting the European Charter for Researchers and the Code of Conduct for Recruitment of Researchers, and to identify barriers to the mobility of researchers and provide recommendations for overcoming them. These initiatives are the first step towards improvements in the HR management of the research institutions. In accordance with the 2012 entity-level STI strategy of RS which foresees the acceptance of recommendations of the European Commission and signing of the Charter and Code in 2013 (RS Government, 2012), the two public universities in Republic of Srpska – University of Banja Luka and University of East Sarajevo have signed the Charter and Code in February 2013. This makes a total of 13 BiH institutions and organisations that have already declared their intention to use the HR Strategy for Researchers to align their policies and practices to the principles of the Charter & Code[93]. However, there are still no specific measures in place for removing legal and other barriers for recruitment of researchers in accordance with the Charter and Code. Only two public BiH universities participated in the cohorts of the European Commission's initiative "Human Resources Strategy for Researchers" (HRS4R); the University of East Sarajevo (in the 4th Cohort) and the University of Banja Luka (in the 3rd Cohort) (Deloitte Consulting, 2013). There are still no institutions in BiH which have received the HRS4R acknowledgment[94]. Collective labour agreements in BiH do not address the Charter and Code provisions for researcher

[88] More information available at: http://bit.ly/1f9sTAN (Only in Bosnian/Croatian/Serbian).
[89] http://bit.ly/1g8xtTB
[90] http://wbc-inco.net/co-ordination_of_research_policies_with_the_western_balkan_countries_en
[91] http://www.euraxess.ba/
[92] http://www.ncp.ba/en/questionnaire-project-webinunion.aspx
[93] http://ec.europa.eu/euraxess/index.cfm/rights/charterAndCode
[94] http://ec.europa.eu/euraxess/index.cfm/rights/strategy4ResearcherOrgs

profession. Bosnia and Herzegovina has not promoted concrete measures to attract and retain 'leading' national, EU and third-country researchers (Deloitte Consulting, 2013). There are no initiatives on a national level in terms of removing legal barriers through legislative reforms, besides the general openness to cross-border access expressed in national and entity-level STI strategies.

### Research Infrastructures

The country is not a member of the European Strategy Forum on Research Infrastructures (ESFRI) and the European Commission Research and Innovation Infrastructures Map[95] and MERIL Portal[96] currently do not identify any research infrastructures in Bosnia and Herzegovina in any of the research areas.

Regarding the research infrastructure, the 2009 national STI strategy recommends the renewing of the research infrastructures, especially in priority areas defined in the Strategy, and increased investments in research equipment (BiH Council of Ministers, 2009). The 2012 entity-level STI strategy of RS envisages the making and maintaining of the register of equipment in RS; integration of research capacities at universities, research organisations and in enterprises; and further purchase of scientific equipment (RS Government, 2012). The draft 2011 entity-level STI strategy of FBiH suggests the establishment of a Research, Technology and Development Fund in FBIH for which the priority in the first years of operation would be investments in research infrastructures (FBiH Government, 2011).

## 4.2 Getting good ideas to market

### Improving access to finance

Support schemes for SMEs do not exist at the state level, since entity governments are in charge of this area. In FBiH there is no coordination of support schemes between the responsible ministries, while the coordination exists to certain extent in RS. Support schemes also exist at the level of municipalities in BiH, while in FBiH they also exist on the cantonal level, but there is no consolidated data available for cantons and municipalities across BiH. ERAWATCH Country Report 2011 already indicated that there are difficulties in distinguishing a policy mix for research in BiH from documents guiding research and innovation, and other policies affecting research (Jahić, 2011a). There is no coordination between them and only international institutions such as Swedish International Development Cooperation Agency (SIDA), World Bank, the German Society for International Cooperation (GIZ), European Bank for Reconstruction and Development (EBRD), and U.S. Agency for International Development (USAID) have created several financial instruments fostering innovation in the country hitherto (Jahić, 2011a). World Bank indicates that the overall progress in its "Enhancing Small and Medium Enterprise Access to Finance" project (2010-2016) has been moderate and inconsistent between the entities[97], after disbursing 99% of total project funds in amount of €47.8m by 2012 to OdRaz Foundation[98] in the Federation of BiH and Republic of Srpska Investment - Development Bank[99] as project implementation units. Additional financing for the original loan in the amount of €90.1m was

[95] http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=mapri
[96] http://portal.meril.eu/converis-esf/publicweb/startpage?lang=1
[97] http://www.worldbank.org/projects/P111780/enhancing-sme-access-finance?lang=en
[98] http://www.odraz.ba/
[99] http://www.irbrs.org/azuro3/a3/index.php?lang=engleski&id=24&tr=

approved in 2012[100]. The 2013 Audit of USAID/SIDA "Fostering Interventions for Rapid Market Advancement – FIRMA", a €14.4m five-year project that began in September 2009, indicates that beneficiaries had difficulties in obtaining funds through Development Credit Authority because major BiH banks set high lending criteria that hinder borrowing. Small fast-growing companies with insufficient collateral were considered risky and larger banks avoided them, while small local banks charged higher interest rates because their sources of capital are more expensive (USAID, 2013). ACIPS Sarajevo 2011 policy brief "Support for the Courage and Ideas of Small and Medium-sized Enterprises: The Community Entrepreneurship and Innovation Programmes" also pointed out that the exact amount of government financial incentives for SMEs at all levels in BiH is not known, while banks have not yet reached a level of preparedness to invest in risky business ventures (ACIPS, 2011). The document indicates a great need for strengthening existing and establishing new loan guarantee funds in BiH that would secure financial guarantees for encouraging a business activity, i.e. the SME sector (ACIPS, 2011). There are two guarantee funds in RS[101] and four in FBIH. The chance to provide additional venture capital and guarantees through Entrepreneurship and Innovation Programme (EIP) was not used (see 5.3). At the end of 2012, the Western Balkan Enterprise Development and Innovation Facility (WB EDIF)[102] was established, with the aim to promote the emergence and growth of innovative and high-potential companies, as well as the creation of a regional venture capital market. The facility is coordinated by the European Investment Fund and implemented in close cooperation between the governments of the Western Balkans, the European Commission, the European Investment Bank and the European Bank for Reconstruction and Development.

Network of Business Angels of Innovation Centre Banja Luka (ICBL)[103] was established in April 2012 and became the first full Member of the European Business Angels Network (EBAN) from Bosnia and Herzegovina. The membership provides the monitoring of trends in venture capital market, following the development of new financing instruments, as well as opening the possibility of cross-border investment and access to ideas from different sources[104]. BIZOO - Business Start-Up Accelerator[105] was established in mid-2013, supported by USAID. The goal of the BIZOO program is to serve as a base for activities of the Business Angel Network, allowing investors to create contacts with young companies that are ready for the second phase of investment[106].

Doing Business 2014: Smarter Regulations for SMEs indicates that on average, firms in BiH make 40 tax payments a year, spend 407 hours a year filing, preparing and paying taxes and pay total taxes amounting to 25.5% of profit (World Bank, 2013c). Globally, BiH stands at 135 in the ranking of 189 economies on the ease of paying taxes, and in 2013 the country eased the administrative burden of filing and paying social security contributions by implementing electronic filing and payment systems (World Bank, 2013c). However, there are still no favourable taxation regimes for venture capital and business angels. Despite the establishment of a state aid authority and the appointment of a secretariat, both are not fully operational as implementing legislation and budget remains to be adopted (EC, 2013a). Transparency of all state aid granted in Bosnia and Herzegovina is not yet ensured as the country fails to provide

[100] http://www.worldbank.org/projects/P111780/enhancing-sme-access-finance?lang=en
[101] Of which one is at the local level, in the City of Banja Luka.
[102] http://www.eif.org/what_we_do/guarantees/news/2012/wbedif.htm
[103] http://www.icbl.ba
[104] More information available at: http://bit.ly/1awsJjn.
[105] http://www.bizoo.ba/
[106] More information available at: http://bit.ly/19GQbhB .
[106] http://bizooangels.ba/

comprehensive state aid inventory consolidated at the country level (EC, 2013a).World Economic Forum's World Competitiveness Report 2013-2014 ranks BiH as last, 148th out of 148 ranked countries in business sophistication – state of cluster development (Schwab, 2013)[107]. The 2009 national STI strategy and its entity-level counterparts do not provide specific cluster policies. Regarding the government support to clusters, there is only a small credit line of the Investment-Development Bank of RS, in addition to the situation that clusters in transition countries develop primarily with the support of international promoters, and with further limit to their development in BiH in the lack of social capital and trust between businesses (Domljan, 2013). It was therefore that some of already formed clusters[108] disappeared due to the lack of international support, as was the case with Automotive Cluster of BiH (Domljan, 2013).

**Protect and enhance the value of intellectual property and boosting creativity**

Regulatory framework for intellectual property in Bosnia and Herzegovina is based on the Patent Law, Trademark Law, Law on Industrial Designs, Law on the Protection of Indications of Geographical Origin, Law on the Protection of Topographies of Integrated Circuits, Copyright and Related Rights Law, and Law on the Collective Management of Copyright and Related Rights[109] together with international agreements applied in BiH[110]. However, there are no special legal regulations covering the field of intellectual property rights (IPR) on the BiH universities and research organisations. Supporting efforts include occasional events bringing together researchers from different institutions and innovators with different affiliations from around the country. The European Patent Academy in cooperation with the Institute for Intellectual Property of Bosnia and Herzegovina organized seminars on European patent system and patent protection in Europe in April and May 2013 in Sarajevo, Mostar and Banja Luka[111]. The Institute for Intellectual Property of Bosnia and Herzegovina in cooperation with the European Patent Office (EPO) and the Faculty of Mechanical Engineering of the University of Banja Luka organised a working and educational seminar titled „The European Patent System – Workshop for Researchers", held on 17 September 2013 in Banja Luka[112]. The seminar was intended for innovators, inventors, scientific workers, staff of the Institute and other interested parties.

Efforts for boosting creativity are in the range of STI promotion events and awards. The "Young Innovators: Best Innovations" competition was held to mark EU Mobility Week (16 - 22 September 2013), the annual initiative implemented with the support of the European Commission's Directorate-General for Environmental Protection. The competition was organised by the Delegation of the European Union to Bosnia and Herzegovina in cooperation with the BiH Association of Innovators. 13 BiH innovators under the age of 25 showcased their innovative work, and three were awarded prizes[113]. The Delegation of the EU also supported the "Researchers' Night 2013"[114] - an FP7-funded event that took place on September 27th 2013 in Sarajevo and Banja Luka[115]. The RS Ministry of Science and Technology organised the seventh "Best Technological Innovation Competition" in 2013, with emphasis on connection between

[107] World Competitiveness Report 2012-2013 ranked BiH as 135th out of 144 ranked countries in business sophistication – state of cluster development.
[108] More information on already established clusters is available at: http://bit.ly/K9fwq3 (pp. 30-34). End-of-2012 establishment of "RTD-Health Cluster" (http://www.rtdcluster-health.rs.ba) is also illustrative of the scope of clustering efforts in BiH.
[109] More information available at: http://bit.ly/1ah0V0X .
[110] More information available at: http://bit.ly/187djTU .
[111] http://www.ipr.gov.ba/en/vijesti-en/723-seminars-on-european-patent-system-and-patent-protection-held.html
[112] http://www.ipr.gov.ba/en/vijesti-en/727-banjaluka-workshop-for-researches-held.html
[113] More information available at: http://www.delbih.ec.europa.eu/News.aspx?newsid=5872&lang=EN
[114] http://www.nocistrazivaca.ba/.
[115] More information available at: http://europa.ba/News.aspx?newsid=5872&lang=EN .

innovation and entrepreneurship and university/business collaboration[116], as well as the third "Festival of Science", aimed at younger audience[117].

BiH still has to develop a comprehensive industrial strategy and implement the State level strategy for SMEs, while the European Regional Development Fund (ERDF) is not available to support promotion interaction between research institutions and SMEs (Jahić, 2011a). The Ministry of Civil Affairs of Bosnia and Herzegovina has actively participated in a number of projects dealing with the issue of overcoming the obstacles in industry-academia cooperation, such as the FP6 "Web in Union Project – WEBMOB"[118] and FP7 "Inter-sectoral Mobility of Researchers in South-Eastern Europe Project - ISEEMOB"[119] (Deloitte Consulting, 2013). BiH Ministry of Civil Affairs is also represented in the Steering Committee of The Western Balkans Regional R&D Strategy for Innovation which was adopted in October 2013 (see 2.4). The Strategy proposes reforms to improve the involved countries' research bases, promote collaboration and technology transfer between research institutions and industry, push business innovation and innovative start-ups, and strengthen the governance of national research and innovation policies (Tatalović, 2013). EU – funded project "Institutional capacity development of the three innovations centres and research sector in Bosnia and Herzegovina" (INOVO) aims to increase the institutional capacity development of the innovation centres in Banja Luka, Mostar and Zenica, and of the research sector in Bosnia and Herzegovina[120]. The project is working with public, university/research and business sectors to develop innovation partnerships on themes of relevance for the BiH economy. However, the Researchers' Report 2013 points out thatgovernments in Bosnia and Herzegovina have not promoted any concrete measures encouraging researchers to move from the public to the business sector and vice-versa (Deloitte Consulting, 2013). There are also no knowledge transfer strategies and Open Access is not actively promoted in the country (see 5.5).

**Public procurement**

Inno Policy TrendChart Mini Country Report / Bosnia and Herzegovina 2011 indicated that the significant drop in domestic demand for R&D was complemented with a lack of demand-side innovation policy measures in BiH, such as the lack of innovation procurement section in the Strategy for Development of Public Procurement System in BiH 2010-2015, adopted in May 2010 (Jahić, 2011b). Current EU-oriented efforts related to public procurement system in BiH are to support the introduction of the new Law on Public Procurement in BiH (which has been drafted by the Public Procurement Agency and Procurement Review Body of BiH[121] at the end of 2012), focusing on support for effective functioning of the central public procurement institutions and public procurement structures and policies[122]. In July 2013 the House of Representatives of the Parliamentary Assembly of Bosnia and Herzegovina adopted the changes to the Law on Public Procurement, which is currently in effect. The changes address the appeals procedure and related fees. The changes are still in the area of alignment and harmonization of regulations in terms of thresholds and deadlines, while there are still no public procurement policies that would set national targets on public procurement of innovative goods and services and include innovation criteria in public tenders.

[116] More information available at: http://bit.ly/19jFmwN (only in Bosnian/Croatian/Serbian).
[117] More information available at: http://www.ues.rs.ba/en/university/news/festival-ofscience-begins
[118] http://webmob.masfak.ni.ac.rs/sitegenius/index.php?done .
[119] http://www.iseemob.eu/sitegenius/index.php
[120] http://www.inovo.ba/
[121] http://www.javnenabavke.ba/
[122] http://bit.ly/OajY9c

## 4.3 Working in partnership to address societal challenges

Bosnia and Herzegovina is not a member of the Competitiveness and Innovation Framework Programme (CIP) – Entrepreneurship and Innovation Programme (EIP). The history of BiH's accession to EIP started in 2006 when the state-level BiH Ministry of Foreign Trade and Economic Relations sent a Letter of Interest to the Directorate-General for Industry and Entrepreneurship in charge of the EIP sub-programme, expressing its interest in the participation in EIP, but back then conditions for BiH's participation in EIP were not yet in place (ACIPS, 2011). In the meantime BiH adopted a state-level strategic framework on the development of the SME sector, which represents a step forward when it comes to the accession to these programmes (ACIPS, 2011). In January 2011, the interest in BiH's accession to the EIP sub-programme was expressed again and a letter was sent. The Directorate-General for Industry and Entrepreneurship informed the Ministry that it will not be possible to provide support for functioning of the European Entrepreneurship Network (EEN) in BiH. The BiH Ministry of Foreign Trade and Economic Relations decided in 2012 to start the activities on accession to EIP's successor COSME (Programme for the Competitiveness of Enterprises and SMEs) in 2014. However, Bosnia and Herzegovina does not yet have a status of a participating country and can apply only to a separate call for proposals for COSME Enterprise Europe Network 2015/2012[123].

## 4.4 Maximising social and territorial cohesion

There is no smart specialisation strategy in Bosnia and Herzegovina. The country is still in the status of potential candidate and does not have access to ERDF and other EU structural funds and uses only the first two components of IPA, which are aimed at adapting the BiH legal framework to EU in preparation for the use of structural funds.

The 2009 national STI strategy suggested the creation of the "regional centres of excellence" in specific branches across the entire territory of BiH (BiH Council of Ministers, 2009). The Strategy also suggested that the creation of technology parks should take into account personal and infrastructural capacities of particular areas of BiH, with attention to natural predispositions of those areas (BiH Council of Ministers, 2009). The Strategy proposed the establishment of a technology park in Sarajevo with a focus on information technologies, electronics, mechatronics and bio-medicine; technology park in Tuzla with a focus on chemicals, IT and energy; technology park in Mostar focusing on processing of coloured metals, agri-business, energy efficiency/renewable energy; technology park in Banja Luka with a focus on electronics; and technology park in Zenica dedicated to new materials, metal and wood processing (BiH Council of Ministers, 2009). INTERA Technology Park Mostar[124] functions within the Foundation for Innovation and Technology Development (INTERA) Mostar. The Business Innovation and Technology Park Tuzla (BIT Centre)[125] operates in cooperation with the University of Tuzla and Tuzla Municipality. The Technology Park in Zenica[126] functions as organisational unit of Zenica Local Development Agency (ZEDA). In 2010 Republic of Srpska established the Innovation Centre Banja Luka (ICBL)[127] and the City Development Agency of Banja Luka (CIDEA)[128] is in

[123] http://een.ec.europa.eu/sites/default/files/documents/een_call_qa_14032014.pdf
[124] http://www.intera.ba/eng
[125] https://sites.google.com/a/bitcentar.com/engleski/home
[126] http://www.zeda.ba/service/technopark-zenica/
[127] http://www.icbl.ba/en/
[128] http://www.cidea.org/index.php?option=com_content&view=frontpage&Itemid=1&lang=en

the process of establishing the Technology Business Park. The City of Banja Luka finalized the purchase of property for the technology park in July 2013 and the first contracts for lease of space by investors were signed at the end of the year[129]. In December 2013 the Innovation Centre Banja Luka, BIT Center Tuzla and INTERA Technology Park Mostar, which are from different geographical regions of BiH, agreed to cooperate in order to improve the offering of the programs intended for students with the aim of shortening the period of seeking employment after graduation and increasing the self-employment rate by increasing the number of spin-offs of emerging micro enterprises[130].

The regional approach has partly shifted to the context of the constitutional structure of the country (two entities – RS and FBiH). The 2012 entity-level STI strategy of RS emphasises the role of intermediaries, and within this a more pronounced role of the RS Chamber of Commerce as an intermediary to business enterprise sector with its five regional offices in RS (RS Government, 2012). The regional approach is thus envisaged within the territory of RS and there is progress in relations to local communities through participation of the RS Chamber of Commerce in Agreement on Establishing the Business Friendly Network of RS (see 2.3). The counterpart entity-level network in FBiH is the Network for Local Economic Development in FBiH in which the regional aspects are addressed through participation of the FBiH Chamber of Commerce and four regional development agencies in FBiH (see 2.3).

## 4.5 International Scientific Cooperation

Bosnia and Herzegovina signed bilateral agreements in the field of higher education with Bulgaria, Serbia, Croatia, Greece, Montenegro, Slovenia and Turkey, while in the field of scientific research there are bilateral collaborations with Albania, Bulgaria, Greece, Croatia, Montenegro and Slovenia[131]. Concerning the scientific and educational co-operation with other countries from the region as well as with other European countries, Bosnia and Herzegovina until recently only had results in implementation of joint science & research projects within the framework of science and technology cooperation with Slovenia, with all other forms of activities (joint workshops, conferences, scholar ships, student exchanges) focused on education and mostly on the basis of direct inter-institutional agreements (Korez, Le Gohebel, & Marinković, 2010). In 2012 the activities within the framework of science and technology cooperation with Montenegro started, in which the BiH Ministry of Civil Affairs co-finances the study visit cost for researchers engaged in joint research projects[132]. 28 projects were implemented with Slovenia in 2012 and 2013[133] and 15 with Montenegro in the same period[134]. In 2013 the open call was published for co-financing visit and travel costs of researchers working on the implementation of joint science & research projects in cooperation with Slovenia for the period 2014 -2015 and also an open call was published for co-financing visits and travel costs within the cooperation with Montenegro for the period 2014 -2015[135]. Common ex-post evaluation procedures are envisaged in the cooperation and implemented by the Joint Committee for Scientific and Technological Cooperation of BiH and Slovenia. The two countries co-finance the research project costs and researchers' travel and allowances, and BiH aligns the commitment

[129] http://www.capital.ba/potpisani-ugovori-o-zakupu-sa-cetiri-preduzeca/
[130] http://ekapija.ba/en/Vijest/vijesti/saradnja-inovacionog-centra-bl-bit-centra-i-tehnoloskog-parka-intera/33633
[131] List of agreements with details available at http://bit.ly/1m8uEB9 (pp. 17-19)
[132] http://www.mcp.gov.ba/org_jedinice/sektor_nauka_kultura/konkursi/default.aspx?id=4322&langTag=bs-BA
[133] http://mcp.gov.ba/vijesti/default.aspx?id=2627&langTag=bs-BA
[134] http://bit.ly/1i01QIh
[135] http://wbc-inco.net/object/document/13197/attach/0_Bosnia_and_Herzegovina.pdf

of funds at European level in this instance. Similar procedures are used in the framework of science and technology cooperation with Montenegro.

National grants or fellowships are not open to non-residents (Deloitte Consulting, 2013). Annual competitive calls for research projects by relevant BiH entity ministries are limited to applicants from BiH entities. Current use of the EURAXESS platform in Bosnia and Herzegovina is not governed by national regulation and is more in the range of providing information on vacancies for outgoing researchers (see 5.3). National Progress towards realisation of ERA.

# 5 NATIONAL PROGRESS TOWARDS REALISATION OF ERA

## 5.1 More effective national research systems

Competitive funding is administered through the state and entity-level horizontal support measures, but there are significant discrepancies in funding modes between the state and entity level and a lack of consolidated data, so that the relation of competitive vs. institutional funding cannot be outlined (see 2.2.2). There are no measures for a single approach or target in terms of competitive vs. institutional funding. Initiatives for enhancement of competitive funding are within the 2009 national STI strategy (BiH Council of Ministers, 2009), but the entity-level STI strategies do not follow on this (see 2.2). The state-level Ministry of Civil Affairs distributes its budget for support to innovators and research organisations submitting FP7 proposals through competitive calls, but the share of competitive vs. institutional funding is much lower at the entity level, where most of the funding is performed (see 2.2.2.1). The country does not have long term tradition in evaluation of all R&D performers entitled to receive R&D public funds. The evaluation culture is weak. Institutional assessment and formal evaluation of the institutional funding that would be based on criterion such as "research performance" require a change in trend of maintaining the balanced development of main research fields through horizontal support measures (Jahić, 2011a). However, there is no change in this trend, mainly due to very limited resources for research and innovation which are distributed in order to maintain the core functioning of research institutions. There is no international peer review involved in any of the funding measures.

## 5.2 Optimal transnational co-operation and competition

BiH is not represented in ESFRI and there are no research infrastructures of European interest. The 2012 entity-level STI strategy of RS (RS Government, 2012) and the 2011 draft entity-level STI strategy of FBiH (FBiH Government, 2011) address different aspects of developing new infrastructure for scientific research, with emphasis on increased investment (see 4.1). Bosnia and Herzegovina does not participate in any of the Joint Programming Initiatives. According to CORDIS database the country participated in 34 FP7 funded networks, 40 FP6 funded networks and 15 FP5 funded networks[136]. EC's NETWATCH Platform shows that BiH participated in four ERA-NET networks, with one network participation still active[137]. Strategic documents at all levels share the dedication to trans-national cooperation and sharing of information, but the cooperation is limited to bilateral agreements in the field of higher education and scientific research (see 4.5). In these agreements, signatory countries expressed their willingness to intensify their cooperation in the field of science. The most tangible results are seen in the implementation of the Cooperation Agreement with Slovenia within which 28 joint research projects of researchers from both countries was approved in 2012/2013, as well as in cooperation with Montenegro, within which 15 joint research projects were approved in

[136] http://cordis.europa.eu/projects/home_en.html
[137] http://netwatch.jrc.ec.europa.eu/web/ni/network-information/participating-countries

2012/2013 (see 4.5). Alignment with European average in terms of funding needs is not harmonised between national and entity-level STI strategies' long term goals for R&D funding. National funding is not allocated through international evaluation procedure. The entity-level STI strategy of RS (RS Government, 2012) suggests the introduction of the obligatory evaluation of scientific work and results in accordance with internationally recognized standards and with participation of international experts, but there are no concrete measures for implementation

## 5.3 An open labour market for researchers

The EURAXESS BiH Portal[138] continues to provide information on the life and work in Bosnia and Herzegovina, with support from the BiH Ministry of Civil Affairs and Rectorate of the University of Banja Luka (see 4.1). The use of EURAXESS is not governed by national regulation. The Researchers' Report 2013 indicates that more intensive promotional activities need to take place to promote the BiH EURAXESS portal as a place available for job postings (Deloitte Consulting, 2013). There is no portability of grants in Bosnia and Herzegovina and access to grants is limited to residents hired at BiH institutions. Collective labour agreements in BiH do not address the Charter and Code provisions for researcher profession. Principles of Charter & Code are not embedded in the funding criteria of public funding agencies. The provisions in state-level, entity-level and cantonal-level laws on higher education cover the area of researcher recruitment and state the requirements in terms of qualifications, experience and skill sets of candidates. They, however, do not address this in terms of Open, Transparent and Merit-Based Recruitment for research positions. The creation of an enabling framework for the implementation of the HR Strategy for Researchers (HRS4R) incorporating the implementation of European Charter for Recruitment of Researchers & Code of Conduct for Recruitment of Researchers is in the phase of promotion (see 4.1). 13 institutions have signed the Charter & Code by March 2014. There are no institutions from Bosnia and Herzegovina listed in HRS4R initiative[139]. There are initiatives for new curricula addressing innovation skills gaps in the country and structured third-cycle studies at the state and entity level in the 2012 entity-level STI strategy of RS (RS Government, 2012) and the 2012 document "Strategic Directions for Development of Higher Education in FBiH 2012-2022"[140], produced by the FBiH Ministry of Education and Science, in accordance with the TEMPUS IV project "EQADE -Embedding Quality Assurance in Doctoral Education"[141] (see 4.1).

## 5.4 Gender equality and gender mainstreaming in research

There are no specific measures targeting female researchers. Recruitment and career progression of female researchers is not treated separately from other categories in the relevant labour laws at different levels in the country. There are general provisions in BiH entity-level labour laws for employees in case of maternity leave.. There are, however, no provisions on the possible extension of fixed term contracts in case of maternity. The Researchers Report 2013 indicates that the governments in Bosnia and Herzegovina have not put in place concrete measures to promote gender equality in the research profession or to increase the number of female researchers in top-level positions/decision-making bodies (2013, Deloitte Consulting). This is

[138] http://www.euraxess.ba/index.php?lang=en
[139] http://ec.europa.eu/euraxess/index.cfm/rights/strategy4ResearcherOrgs
[140] http://bit.ly/1dROEU8
[141] More information available at: www.wus-austria.org/project/0/89.html

also the case with more advanced concepts, such as the gender mainstreaming of the research agenda. Initiatives for institutional change on gender are within the Gender Action Plan (GAP) of BiH[142] and related strategies, but the main focus in these initiatives is to strengthen individual and collective capacities of governmental institutions, CSOs and parliamentarians in South East Europe. The 2012 entity-level STI strategy of RS addresses the issue of gender quotas in bodies and committees dealing with establishing and evaluating research programmes, but it does not address gender representation in bodies and committees dealing with recruitment/career progression. The 2009 national STI strategy and the draft 2011 entity-level STI strategy of FBiH also do not address this.

## 5.5 Optimal circulation, access to and transfer of scientific knowledge including via digital ERA

There are no institutions from Bosnia and Herzegovina that have signed the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities[143] and there are is only one open access repository of the institutional/departmental type[144]. The activities on preservation of scientific knowledge are performed within the framework of Electronic SEE (e-SEE) Initiative[145] and its updated Electronic Agenda Plus[146] (2011, Regional Cooperation Council) in e-archiving and digitalisation and informatisation of cultural heritage. Initiatives for knowledge transfer and partnerships between the public and private sector are to some extent present at the entity level in the 2012 STI strategy of RS (see 2.3). There is no explicit national policy to promote knowledge transfer at stakeholder level and knowledge transfer activities for university/business platforms. There are also no special legal regulations covering the field of intellectual property rights (IPR) on the BiH universities and research organisations. The trans-national access to digital research services for researchers is enabled through West Balkans regional co-operative bibliographic system – COBISS[147] (Co-operative Online Bibliographic Systems and Services). COBISS software enables users to download records from any of the shared bibliographic databases. Access to foreign databases is regulated under consortium agreements with database providers. Current policies do not address federated identity and trust technologies. The Country is represented in e-Infrastructure Reflection Group (e-IRG) by two delegates from the Ministry of Communications and Transport of Bosnia and Herzegovina[148]. Among the principal objectives of e-IRG is to give input to ESFRI (European Strategy Forum on Research Infrastructures) and NREN (National Research and Education Network). However, Bosnia and Herzegovina is not represented in ESFRI and there is no NREN at the state level.

142 http://www.1325.arsbih.gov.ba/?page_id=6
143 http://openaccess.mpg.de/319790/Signatories
144 http://www.openaccessmap.org/list/?q=&country[]=117&project=-1&content=-1
145 http://www.eseeinitiative.org/
146 http://www.eseeinitiative.org/index.php?option=com_content&view=article&id=46&Itemid=27
147 http://www.cobiss.net/
148 http://www.e-irg.eu/about-e-irg/members.html

# Annex 1. PERFORMANCE OF THE NATIONAL AND REGIONAL RESEARCH AND INNOVATION SYSTEM

| Feature | Assessment | Latest developments |
|---|---|---|
| **1. Importance of the research and innovation policy** | (+) Bosnia and Herzegovina Ministry of Civil Affairs coordinates the science policy and international cooperation through its Department of Science and Culture, and the coordination of SME policies at the state level is done by the BiH Ministry of Foreign Trade and Economic Relations .<br>(+) The 2009 national STI strategy suggested the regional approach for addressing major societal challenges across the country, with regard to personal and infrastructural capacities of particular areas of BiH, and to natural predispositions of those areas. | (+) In June 2013, ministers of science from all governance levels in BiH agreed to improve the coordination between ministries at different levels and strengthen the institutional capacities.<br>(-) The regional approach envisaged in the 2009 national STI strategy was not used in addressing the grand challenges. This is partly due to the complex constitutional structure of the country. |
| **2. Design and implementation of research and innovation policies** | (+)The country has a national STI strategy, adopted in 2009, with the 2010-2015 time frame, which provides directions for R&D funding. the strategy reflects EU priorities, avoiding duplication and fragmentation.<br>(-) The operational capacity is distributed to BiH entities which have drafted their entity-level STI strategies. There are discrepancies between the 2009 national STI strategy and strategies at entity level in terms of envisaged GERD and BERD share in GERD (see 2.2). | (-) Centre of government structure that is monitoring the 2009 national STI strategy is the BiH Ministry of Civil Affairs. However, this is a coordinating ministry, with operating power distributed to lower governance levels (entities and cantons). Networks of relevant stakeholders are connected to those levels.<br>(-) Output indicators are also collected on the lower governance levels, where coordination is a problem in making full use of them. There is no international benchmarking performed. |
| **3. Innovation policy** | (-)The innovations are not considered as a key driver of competitiveness and job creation, but are treated as other priorities such as budget deficits, wage insurance and pensions, European integration, agricultural policy, fight against corruption, etc. (Jahić, 2011a). | (-) There are no public procurement policies that would set national targets on public procurement of innovative goods and services and include innovation criteria in public tenders. Lack of demand side innovation policy is evident in recent changes and improvements to the current Law on Public Procurement . |
| **4. Intensity and predictability of the public investment in research and innovation** | (+) The main policy instruments for financing scientific research (programmes for scientific and research activities) follow a horizontal approach to assure the balanced development of the six main fields of science (agricultural sciences, natural sciences, engineering and technology, medical and health sciences, social sciences and humanities).<br>(+) The 2012 entity-level STI strategy of RS envisages BERD of 0.3% RS GDP within the envisaged 0.5% RS GDP GERD in 2015. | (-) Tax incentives and public-private partnerships are not used for innovative activities.<br>(-) Envisaged SME support mechanisms still remain inactive (EC, 2013a). BiH does not yet have access to Strucutural Funds.<br>(+) BiH Agency of Statistics started to provide R&D data for the entire territory of BiH in early 2014, which indicates that the BERD share in GERD is increasing in comparison to previous estimates based on regional (RS) statistics (see 2.2) |
| **5. Excellence as a key criterion for research and education policy** | (-)The country does not have a long term tradition in evaluation of all R&D performers entitled to receive R&D public funds. The evaluation culture is weak. It is only since recently (in the 2012 entity-level STI strategy of RS) that the internationalisation of peer | (-)There are no specific initiatives addressing the open, transparent and merit based recruitment of researchers at national or regional level. Higher education and research institutes have the autonomy to apply the open recruitment methods, but there are no indications of |

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| | review is suggested.<br>(-) Publicly funded grants or fellowships are only for local students and national grants or fellowships are not open to non-residents. Research grants are not portable across borders and institutes.<br>(-) Funding allocation mechanisms in place are input-based and incremental and they cover the operating costs of HEIs, with more than 80% of budget allocation ending up as staff salaries (Branković & Branković, 2013). | initiatives in that direction.<br>(-) Global Competitiveness Report 2013 ranks BiH as 143rd out of the 148 countries in respect to capacity to retain talent and as 140th in respect to capacity to attract talent (Schwab, 2013). |
| **6. Education and training systems** | (+) Ministries of education in BiH stimulate the students to enrol in mathematics and science programmes at universities due to shortage of mathematics and science teachers at elementary and high school level.<br>(+) There are initiatives for new curricula addressing innovation skills gaps in the country and structured third-cycle studies.<br>(+) Country participates in TEMPUS project "EQADE -Embedding Quality Assurance in Doctoral Education", aimed at addressing current problems and defining strategic directions of doctoral studies at public universities in Bosnia and Herzegovina. | (-)Global Innovation Index Report 2013 indicates the weakness of Bosnia and Herzegovina in QS university ranking, placing the country at 68th position out of 142 countries (Doutta, 2013).<br>(-) WEF Global Competitiveness Report 2013-2014 ranks the country's quality of education system as 132nd out of 148 ranked countries (Schwab, 2013).<br>(+)WEF Global Competitiveness Report 2013-2014 however ranks the country's quality of mathematics and science education as 13th out of 148 ranked countries (Schwab, 2013). |
| **7. Partnerships between higher education institutes, research centres and businesses, at regional, national and international level** | (-) There is no excellence-based evaluation for funding that would stimulate the universities to network with businesses.<br>(-) The 2009 national STI strategies and its entity-level counterparts do not provide specific cluster policies. The involvement of the industry sector is very limited and only provides financial resources towards the practical application of the R&D results (Deloitte Consulting, 2013).<br>(-)There is no data on the inward mobility of researchers | (-) World Economic Forum's World Competitiveness Report 2013-2014 ranks BiH as last, 148th out of 148 ranked countries in business sophistication – state of cluster development (Schwab, 2013).<br>(-) Of the total number of R&D projects financed by the European Union in Western Balkans region, BiH ranks last in its usage of available EU financial means for education and research (EC, 2012). Compared to Croatia's €28 million for 152projects through the EU FP7 fund, or Serbia's €15.5 million for 119 projects, Bosnia and Herzegovina utilised just €1.5 million over the course of 18 projects (EC, 2012). |
| **8. Framework conditions promote business investment in R&D, entrepreneurship and innovation** | (-)Support schemes for SMEs do not exist at the state level, and there is a lack of coordination of support schemes at the entity level.<br>(-) The exact amount of government financial incentives for SMEs at all levels in BiH is not known, while banks have not yet reached a level of preparedness to invest in risky business ventures (ACIPS, 2011)<br>(+)Regulatory framework for intellectual property in Bosnia and Herzegovina is based on laws regulating patents, trademarks, industrial designs, protection of geographical origin, copyright and related rights, together with international agreements applied in BiH | (+) The 2012 entity-level STI strategy of RS and the draft 2011 entity-level FBiH STI strategy envisage support for research in the industry sector and R&D centres in businesses, (RS Government, 2012).<br>(+)Reforms have been initiated towards introduction of a countrywide unified business register and one-stop shops to simplify doing business in both entities (EC, 2013a).<br>(-)There are still no favourable taxation regimes for venture capital and business angels |
| **9. Public support to research and innovation in businesses is simple, easy to access, and** | (-) National funding is not allocated through international evaluation procedures and does not encourage trans-national cooperation.<br>(-) Funding schemes do not have international evaluation are not yet benchmarked against comparable schemes in other countries. | (-) There was little progress in the area of industrial and SME policies. The regulatory environment remains complex and the regulatory burden on SMEs heavy (EC, 2013a).<br>(+) Business angel networks started to emerge since 2012 allowing investors to create contacts with young companies, with possibilities of |

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| **high quality** | | cross-border investments (see 4.2). |
| **10. The public sector itself is a driver of innovation** | (-) There are no formal incentives to stimulate innovation within public sector and in the delivery of public services. | (-) There are still no public procurement policies that would set national targets on public procurement of innovative goods and services and include innovation criteria in public tenders. |

# Annex 2. NATIONAL PROGRESS ON INNOVATION UNION COMMITMENTS

| | | Main changes | Brief assessment of progress / achievements |
|---|---|---|---|
| 1 | **Member State Strategies for Researchers' Training and Employment Conditions** | (+) The signing of Charter and Code is actively promoted by the government institutions and is part of recent STI strategies.<br>(-) National grants or fellowships are not open to non-residents.<br>(-) The use of Euraxess is still not governed by national regulation. | (+) There are 13 BiH institutions and organisations that have already signed the Charter & Code<br>(-) There are still no specific measures in place for removing legal and other barriers for recruitment of researchers and there are no institutions in BiH which have received the HRS4R acknowledgment. |
| 4 | **ERA Framework** | | |
| 5 | **Priority European Research Infrastructures** | (+) The 2012 entity-level STI strategy of RS and draft 2011 entity-level STI strategy of FBiH envisage further investments in research equipment and integration of research capacities at universities. | (-) The country is not a member of ESFRI and there are no research infrastructures of European interest in the country.<br>(-) There is no regulation related to cross-border merit-based access to RI. |
| **7** | **SME Involvement** | (-) No recent measures | (-) Support schemes for SMEs do not exist at the state level, since entity governments are in charge of this. The coordination of support schemes between BiH entities is weak. |
| 11 | **Venture Capital Funds** | (+) At the end of 2012, the Western Balkans Enterprise Development and Innovation Facility (WB EDIF) . The facility is coordinated by the European Investment Fund.<br>(+) Network of Business Angels of Innovation Centre Banja Luka (ICBL) was established in April 2012.<br>(+) BIZOO - Business Start-Up Accelerator and Business Angel Network were established in mid-2013, supported by USAID. | (-) Bosnia and Herzegovina is not a member of CIP-EIP.<br>(-) There are no favourable taxation regimes for venture capital and business angels.<br>(+) There are initiatives regarding the new financing instruments, regional venture capital market and cross-border investment. |
| 13 | **Review of the State Aid Framework** | (+) The Parliamentary Assembly of BiH has made some progress initially by adopting EU-related legislation, in particular by adopting the State Aid Law and establishing of state aid authority. | (-) Despite the establishment of a state aid authority and the appointment of a secretariat, both are not fully operational as implementing legislation and budget remains to be adopted. |
| 14 | **EU Patent** | BiH is still in the status of potential candidate country | BiH has not ratified the Agreement on a Unified Patent Court. |
| 15 | **Screening of Regulatory Framework** | (-) For the state and entity-level framework there is no ex-ante or ex-post screening. | (-) The progress is still evaluated through the overall improvement of the scientific system and scientific excellence in general sense. |
| 17 | **Public Procurement** | (-) There are no changes to the lack of innovation procurement section in the Strategy for Development of Public Procurement System in BiH 2010-2015 adopted in May 2010. | (-) Recent changes and improvements to the current Law on Public Procurement and efforts on introduction of the new Law are still in the area of alignment and harmonization of regulations in terms of thresholds and deadlines. |
| 20 | **Open Access** | (+) The 2012 entity-level STI strategy of RS and draft 2011 entity-level STI strategy of FBiH envisage the | (-) Open Access is not actively promoted.<br>(+) The trans-national access to digital research services is enabled through regional |

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| | | facilitation of access to electronic science databases with books, journals, and conference proceedings and additional funding at the entity level for establishing of functional access to resources and science metrics. | co-operative bibliographic system – COBISS , managed by the Virtual Library of BiH .<br>(-) Current policies do not address identity and trust technologies for researchers' access.<br>(-) There is no involvement of business enterprise sector. |
| 21 | **Knowledge Transfer** | (+) The 2012 STI law in RS and the 2012 entity-level STI strategy of RS, that followed from the mentioned law, provide the directions for the commercialisation of research results. infrastructural support and linkage between science and research organizations and business enterprises. | (-) There is no explicit national-level policy to promote knowledge transfer at stakeholder level.<br>(-) There is no comprehensive SME strategy.<br>(-) The weak market does not stimulate the cooperation between stakeholders. This is a structural challenge (see 3.2). |
| 22 | **European Knowledge Market for Patents and Licensing** | (+)The Institute for Intellectual Property of Bosnia and Herzegovina organized seminars and workshops for BiH institutions and researchers on European patent system and patent protection in Europe in cooperation with the European Patent Office (EPO) and the European Patent Academy in 2013 | (-) Regulatory framework for intellectual property in Bosnia and Herzegovina is based on patent and trademark laws together with international agreements applied in BiH. However, there are no special legal regulations covering the field of intellectual property rights (IPR) on the BiH universities and research organisations. |
| 23 | **Safeguarding Intellectual Property Rights** | (- ) There are no recent initiatives | (+) Bylaws to the Competition Act of 2005 (BiH Official Gazette 48/05) provide measures for certain categories of horizontal agreements and technology transfer agreements |
| 24 | **Structural Funds and Smart Specialisation** | (-) Bosnia and Herzegovina is in the potential candidate status and does not have access to structural funds. | (-) There is no strategy on smart specialisation. |
| 25 | **Post 2013 Structural Fund Programmes** | Bosnia and Herzegovina is in the potential candidate status and does not have access to Structural Funds | |
| 26 | **European Social Innovation pilot** | Bosnia and Herzegovina is in the potential candidate status and does not have access to European Social Fund | |
| 27 | **Public Sector Innovation** | (-) There are no recent measures. | (-) There are no specific policies or competitions for initiatives coming from public sector.<br>(-) Publication of government owned data is not specifically regulated for these purposes. |
| 29 | **European Innovation Partnerships** | (-) Bosnia and Herzegovina did not become a member of CIP-EIP | (+) The Country is preparing for participation in COSME from 2014. |
| 30 | **Integrated Policies to Attract the Best Researchers** | (-) There are no recent policies targeting researchers from third countries and no specific measures in place for removing legal and other barriers for recruitment. | (-) Publicly funded grants or fellowships are only for local students and national grants or fellowships are not open to non-residents. |
| 31 | **Scientific Cooperation with Third Countries** | (+) There are results in implementation of the Cooperation Agreements with Slovenia and Montenegro. | (-) Scientific cooperation activities are still to the largest extent on the basis of direct inter-institutional agreements. |
| 32 | **Global Research** | (-) No recent initiatives. | (-) The country is not involved in any agreements on development of global RIs |

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| | **Infrastructures** | | |
| 33 | **National Reform Programmes** | Bosnia and Herzegovina is in the potential candidate status and does not have a National Reform Programme for reaching Europe 2020 targets. | |

# Annex 3. NATIONAL PROGRESS TOWARDS REALISATION OF ERA

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| ERA Priority | ERA Action code | ERA Action | Recent changes | Assessment of progress in delivering ERA |
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| **1. More effective national research systems** | **MS01** | Action 1: Introduce or enhance competitive funding through calls for proposals and institutional assessments | There are no new horizontal support measures for competitive funding. | (-) Share of competitive vs. institutional funding in relation to GBAORD is not available. (see 2.2.2.1). |
| | **MS02** | Action 2: Ensure that all public bodies responsible for allocating research funds apply the core principles of international peer review | The 2012 entity-level STI strategy of RS) envisages the internalisation of the peer review generally. | (-) There is no indication that recent measures are changing the long term tradition in evaluation of all R&D performers. |
| **2. Optimal transnational co-operation and competition** | **MS06** | Action 1: Step up efforts to implement joint research agendas addressing grand challenges, sharing information about activities in agreed priority areas, ensuring that adequate national funding is committed and strategically aligned at European level in these areas | Strategic documents share dedication to trans-national cooperation and sharing of information, but the cooperation is limited to bilateral agreements in the field of higher education and scientific research. There are no recent changes in this. | (-)There is no strategic alignment of committed national funding at European level. (+) There is some progress achieved through cooperation with Slovenia and Montenegro. |
| | **MS07** | Action 2: Ensure mutual recognition of evaluations that conform to international peer-review standards as a basis for national funding decisions | There are no recent changes. | (-) There is no mutual recognition of evaluations in BiH. |
| | **MS08** | Action 3: Remove legal and other barriers to the cross-border interoperability of national programmes to permit joint financing of actions including cooperation with non-EU countries where relevant | There are no recent changes. | (-) There are no initiatives to remove legal and other barriers to the cross-border interoperability of national programmes. |
| | **MS15** | Action 4: Confirm financial commitments for the construction and operation of ESFRI, global, national and regional RIs of pan-European interest, particularly when developing national roadmaps and the next SF programmes | Initiatives are in the form of general commitments to renewal and building of research infrastructures in strategic documents. There are no recent changes in this. | (-) BiH is still not represented in ESFRI. (-)There is no register of equipment at the national level and there are no RIs of European interest in the country. |
| | **MS16** | Action 5: Remove legal and other barriers to cross-border access to RIs | Publicly funded grants are not open to non-residents. There are no recent changes. | (-) There are no initiatives related to this action. |
| **ERA priority 3: An open labour market for researchers** | **MS24** | Action 1: Remove legal and other barriers to the application of open, transparent and merit based recruitment of researchers | There are no initiatives on a national level besides the general in national and entity-level STI strategies. | (-)There are no initiatives related to this action. |
| | **MS25** | Action 2: Remove legal and other barriers which hamper cross-border access to and portability of national grants. | There are no recent changes. | (-) There are no instruments targeting researchers from abroad. |

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| | **MS26** | Action 3: Support implementation of the Declaration of Commitment to provide coordinated personalised information and services to researchers through the pan-European EURAXESS3 network | Current use of the EURAXESS platform is mostly in the range of providing information on vacancies for outgoing researchers. | (+) EURAXESS BiH offers a user-friendly organisation sign-up.<br>(-) The use of EURAXESS is not governed by national regulation. |
| | **MS27** | Action 4: Support the setting up and running of structured innovative doctoral training programmes applying the Principles for Innovative Doctoral Training. | Participation of BiH HEIs in TEMPUS project "EQADE -Embedding Quality Assurance in Doctoral Education" | (+) There are initiatives for new curricula addressing innovation skills gaps in the country and structured third-cycle studies (see 4.1) |
| | **MS28** | Action 5: Create an enabling framework for the implementation of the HR Strategy for Researchers incorporating the Charter & Code | Thirteen research institutions have signed the Charter and Code by March 2014. | (+) Implementation is in the phase of promotion and signing by BiH research institutions<br>(-) There are no institutions from Bosnia and Herzegovina listed in HRS4R initiative. |
| **ERA priority 4: Gender equality and gender mainstreaming in research** | **MS39** | Action 1: Create a legal and policy environment and provide incentives | The 2012 STI Strategy of RS aims to promote and secure equal gender representation in general. | (-) There are no specific initiatives on gender mainstreaming in research. |
| | **MS40** | Action 2: Engage in partnerships with funding agencies, research organisations and universities to foster cultural and institutional change on gender | "Girls in ICT" National Event in BiH is organised since 2012 in this form of partnership. | (-) Nation-wide efforts are mostly limited to institutional capacitating.<br>(+) There are examples of institutional outreach in this regard. |
| | **MS41** | Action 3: Ensure that at least 40% of the under-represented sex participate in committees involved in recruitment/career progression and in establishing and evaluating | The 2012 STI Strategy of envisages the participation of no less than 40% of other gender in relevant policy-making, advisory and management bodies. | (-) Gender representation in bodies and committees dealing with recruitment/career progression is not addressed in STI strategies. |
| **ERA priority 5: Optimal circulation, access to and transfer of scientific knowledge including via digital ERA** | **MS45** | Action 1: Define and coordinate their policies on access to and preservation of scientific information | Efforts within the framework of Electronic SEE (e-SEE) Initiative and its updated Electronic Agenda Plus. | (+) Activities on digitalisation and informatisation of cultural heritage. |
| | **MS46** | Action 2: Ensure that public research contributes to Open Innovation and foster knowledge transfer between public and private sectors through national knowledge transfer strategies | The 2012 STI Strategy of RS envisages the role of technology parks in the transformation of R&D complex and support to technology transfer. | (-) Preparations in the area of industry and SMEs remain at an early stage (ERDF is not available). |
| | **MS47** | Action 3: Harmonise access and usage policies for research and education-related public e-infrastructures and for associated digital research services enabling consortia of different types of public and private partners | Efforts within the e-Infrastructure Reflection Group founded to define and recommend best practices for the pan-European electronic infrastructure efforts and input for ESFRI. | (-) BiH does not have a NREN at national level<br>(-) BiH is not represented in ESFRI |
| | **MS48** | Action 4: Adopt and implement national strategies for electronic identity for researchers giving them transnational access to digital research services | There are no recent changes. | (-) Identity and trust technologies are not addressed in current policies and initiatives. |

# REFERENCES


ACIPS – Association of Alumni of the Centre for Interdisciplinary Postgraduate Studies Sarajevo (2011), Support for the Courage and Ideas of SMEs: The Community Entrepreneurship and Innovation Programmes, ACIPS Policy Brief, http://www.acips.ba/bos/uploads/istrazivanja/eip_brief_eng.pdf

BiH Agency of Statistics (2014), Research and Development 2012, Annual Statistical Release 1, http://www.bhas.ba/saopstenja/2014/NTI_RD_2012_001_01_bos.pdf

Branković, J. & Branković, N. (2013), Overview of Higher Education Research Systems in Western Balkans: Bosnia and Herzegovina, Country Report within the European Integration of Higher Education and Research in the Western Balkans Project, http://www.herdata.org/public/HE_and_Research_in_BiH_FINAL.pdf

BiH Council of Ministers (2009): Strategy for Development of Science in Bosnia and Herzegovina 2010-2015, http://www.mcp.gov.ba/zakoni_akti/strategije/?id=1251, Available only in Bosnian/Croatian/Serbian.

Deloitte Consulting (2013), Researchers Report 2013: Country Profile Bosnia and Herzegovina, European Commission DG Research and Innovation Reports, http://ec.europa.eu/euraxess/pdf/research_policies/country_files/Bosnia%20Herzegovina_Country_Profile_RR2013_FINAL.pdf

Domljan, V. (2013), *BiH Lacks Business Clusters / Interviewer: P. Klincov* [Newspaper article], Nezavisne novine 17/09/2013, http://www.nezavisne.com/posao/privreda/BiH-nedostaju-biznis-klasteri-209668.html, available in English at: http://ekapija.ba/en/Vijest/news/bih-lacks-business-clusters/30179

Doutta, S. (Ed.) (2013), Global Innovation Index Report 2013, INSEAD and WIPO Annual Report, http://www.globalinnovationindex.org/content.aspx?page=gii-full-report-2013

EC - European Commission (2011): Multi-Annual Indicative Planning Document (MIPD) Bosnia and Herzegovina 2011 - 2013, http://ec.europa.eu/enlargement/pdf/mipd_bih_2011_2013_en.pdf

EC - European Commission (2012): SME Participation in FP7, Directorate General for Research and Innovation Report, http://ec.europa.eu/research/sme-techweb/pdf/sme_participaton_in_fp7_oct_2012.pdf

EC - European Commission (2013a), Bosnia and Herzegovina 2013 Progress Report, Working Paper, http://ec.europa.eu/enlargement/pdf/key_documents/2013/package/ba_rapport_2013.pdf

EC - European Commission (2013b), EU Candidate and Pre-Accession Countries' Economic Quarterly, CCEQ 3/2013, http://ec.europa.eu/economy_finance/db_indicators/cpaceq/documents/cceq_2013_q3_en.pdf

Ergarac, Z. (2012), Country Reports 2012: Bosnia and Herzegovina, European Commission JRC analytical report,http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/ba/report_0003?country=ba&tab=reports

FBiH Government (2011): Strategy for Development of Scientific and Development Research Activities in Federation of Bosnia and Herzegovina 2012-2022 (draft), http://www.fmon.gov.ba/images/strategija2.pdf, Available only in Bosnian/Croatian/Serbian.

Jahić, E. (2011a), ERAWATCH Country Reports 2011: Bosnia and Herzegovina, European Commission JRC analytical report, http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/ba/report_0002

Jahić, E. (2011b), Inno Policy TrendChart Mini Country Report / Bosnia and Herzegovina, Pro Inno Europe Thematic Report, http://ec.europa.eu/enterprise/policies/innovation/files/countryreports/bosnia_en.pdf

Korez, S., Le Gohebel, M., & Marinković, I. (2010), Bilateral and Regional Agreements of Cooperation of South Eastern European (SEE) Countries in the Field of Scientific Research and Higher Education: An Assessment Study, UNESCO Regional Bureau for Science and Culture in Europe Background Paper http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Venice/pdf/events/Background%20Paper%20-%20SEE%20Scientific%20Cooperation%20Agreements.pdf

Masnik-Ćulahović, D. (2013), Participation of BiH in EU Programmes Concerned with Scientific Research [PowerPoint slides], http://www.ncp.ba/systems/file_download.ashx?pg=3382&ver=1

OECD (2013), Private Sector Development Policy Handbook: Triple Helix Partnerships for Innovation in Bosnia and Herzegovina, OECD Policy Handbook, http://www.oecd.org/investmentcompact/Triple%20Helix%20English%20Version.pdf

Papon, P. & Pejovnik, S. (2006), Guidelines for a Science and Research Policy in Bosnia and Herzegovina, UNESCO Office Venice and Regional Bureau for Science in Europe (Italy), Science Policy Series 2, http://www.unesco.org/new/en/venice/about-this-office/single-view/news/guidelines_for_a_science_and_research_policy_in_bosnia_herzegovina/

RS Bureau of Statistics (2010), Research and Development 2009, Annual Statistical Release 235/10, http://www.rzs.rs.ba/static/uploads/saopstenja/istrazivanje_i_razvoj_i_inovacije/istrazivanje_i_razvoj/2009/Istrazivanje_I_Razvoj_2009.pdf

RS Bureau of Statistics (2011), Research and Development 2010, Annual Statistical Release 219/11, http://www.rzs.rs.ba/static/uploads/saopstenja/istrazivanje_i_razvoj_i_inovacije/istrazivanje_i_razvoj/2010/Istrazivanje_I_Razvoj_2010.pdf

RS Bureau of Statistics (2012) Research and Development 2011, Annual Statistical Release 233/12, http://www.rzs.rs.ba/static/uploads/saopstenja/istrazivanje_i_razvoj_i_inovacije/istrazivanje_i_razvoj/2011/Istrazivanje_I_Razvoj_2011.pdf

RS Government (2012): Strategy of Scientific and Technological Development of Republic of Srpska 2012-2016, http://www.herdata.org/public/Strategija_NTR_RS-L.pdf , Available only in Bosnian, Croatian, Serbian.

RS Bureau of Statistics (2013) Research and Development 2012, Annual Statistical Release 282/13, http://www2.rzs.rs.ba/static/uploads/saopstenja/istrazivanje_i_razvoj_i_inovacije/istrazivanje_i_razvoj/2012-2013/Istrazivanje_Razvoj_2012.pdf

Schwab, K. (Ed.) (2013), Global Competitiveness Report 2013-2014, World Economic Forum Annual Report, http://www.weforum.org/reports

Tatalović, M. (2013, October 30), West Balkans Sign Up to R&D Pact, *Chemistry World*. Retrieved from: http://www.rsc.org/chemistryworld/2013/10/west-balkans-sign-rd-science-pact

USAID (2013), Audit of USAID / Bosnia and Herzegovina's Fostering Interventions for Rapid Market Advancement Project, Office of Inspector General Audit Report, http://oig.usaid.gov/sites/default/files/audit-reports/9-168-13-003-p.pdf

World Bank (2013a), Bosnia and Herzegovina Partnership Country Snapshot, World Bank Group Snapshot Report, http://www.worldbank.org/content/dam/Worldbank/document/eca/BH-Snapshot.pdf

World Bank (2013b), The Western Balkans Regional R&D Strategy for Innovation, Western Balkans Regional R&D Strategy for Innovation World Bank Technical Assistance Project funded by the European Commission,

http://www.worldbank.org/content/dam/Worldbank/document/eca/WBRIS%20Strategy10-21-13%20web.pdf

World Bank (2013c), Doing Business 2014: Smarter Regulations for Small and Medium-Size Enterprises, World Bank Group Washington DC, DOI: 10.1596/978-0-8213-9615-5, CC by 3.0, Creative Commons Attribution CC by 3.0, http://www.doingbusiness.org/data/exploreeconomies/bosnia-and-herzegovina

# LIST OF ABBREVIATIONS

| | |
|---|---|
| BERD | Business Expenditure on Research and Development |
| BiH | National acronym for Bosnia and Herzegovina (Bosna i Hercegovina) |
| COST | European Cooperation in Science and Technology |
| COBISS | Co-operative Online Bibliographic Systems and Services |
| COSME | Programme for the Competitiveness of Enterprises and SMEs |
| CIP | Competitiveness and Innovation Framework Programme |
| EBAN | European Business Angels Network |
| EBRD | European Bank for Reconstruction and Development |
| EC | European Commission |
| EIP | Entrepreneurship and Innovation Programme |
| ENIC | European Network of Information Centres |
| EPO | European Patent Office |
| ERA | European Research Area |
| ERDF | European Regional Development Fund |
| ESFRI | European Strategy Forum on Research Infrastructures |
| EU | European Union |
| EU-27 | European Union including 27 Member States |
| EUREKA | A Europe-Wide Network for Market-Oriented Industrial R&D and Innovation |
| FBiH | National acronym for BiH entity of Federation of Bosnia and Herzegovina (Federacija Bosne i Hercegovine) |
| FP | Framework Programme |
| FP7 | 7th Framework Programme |
| GBAORD | Government Budget Appropriations or Outlays on R&D |
| GDP | Gross Domestic Product |
| GERD | Gross Domestic Expenditure on R&D |
| GIZ | Gesellschaft fur Internationale Zusammenarbeit |
| HRS4R | European Commission's Human Resources Strategy for Researchers |
| HEI | Higher education institution |
| HEA | Agency for Development of Higher Education and Quality Assurance of Bosnia and Herzegovina |
| HEAARS | Higher Education Accreditation Agency of Republic of Srpska |
| IA | Interim Agreement |
| IFC | International Finance Corporation |
| IPA | EU Instrument for Pre-Accession Assistance |
| ISCED | International Standard Classification of Education |
| JRC | European Commission Joint Research Centre |
| NACE | Statistical Classification of Economic Activities in the European Community |
| NCP | National Contact Point |
| NREN | National research and education network |
| OECD | Organisation for Economic Co-operation and Development |
| PCT | Patent Cooperation Treaty |
| PRO | Public research organisation |
| R&D | Research and development |
| RI | Research infrastructure |
| RS | National acronym for the BiH entity of Republic of Srpska (Republika Srpska) |
| SAA | Stabilization and Accession Agreement |
| SIDA | Swedish International Development Agency |
| SME | Small and Medium Sized Enterprise |
| STI | Science, technology, and innovation |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| USAID | United States Agency for International Development |
| WB EDIF | Western Balkan Enterprise Development and Innovation Facility |
| WIPO | World Intellectual Property Organisation |

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